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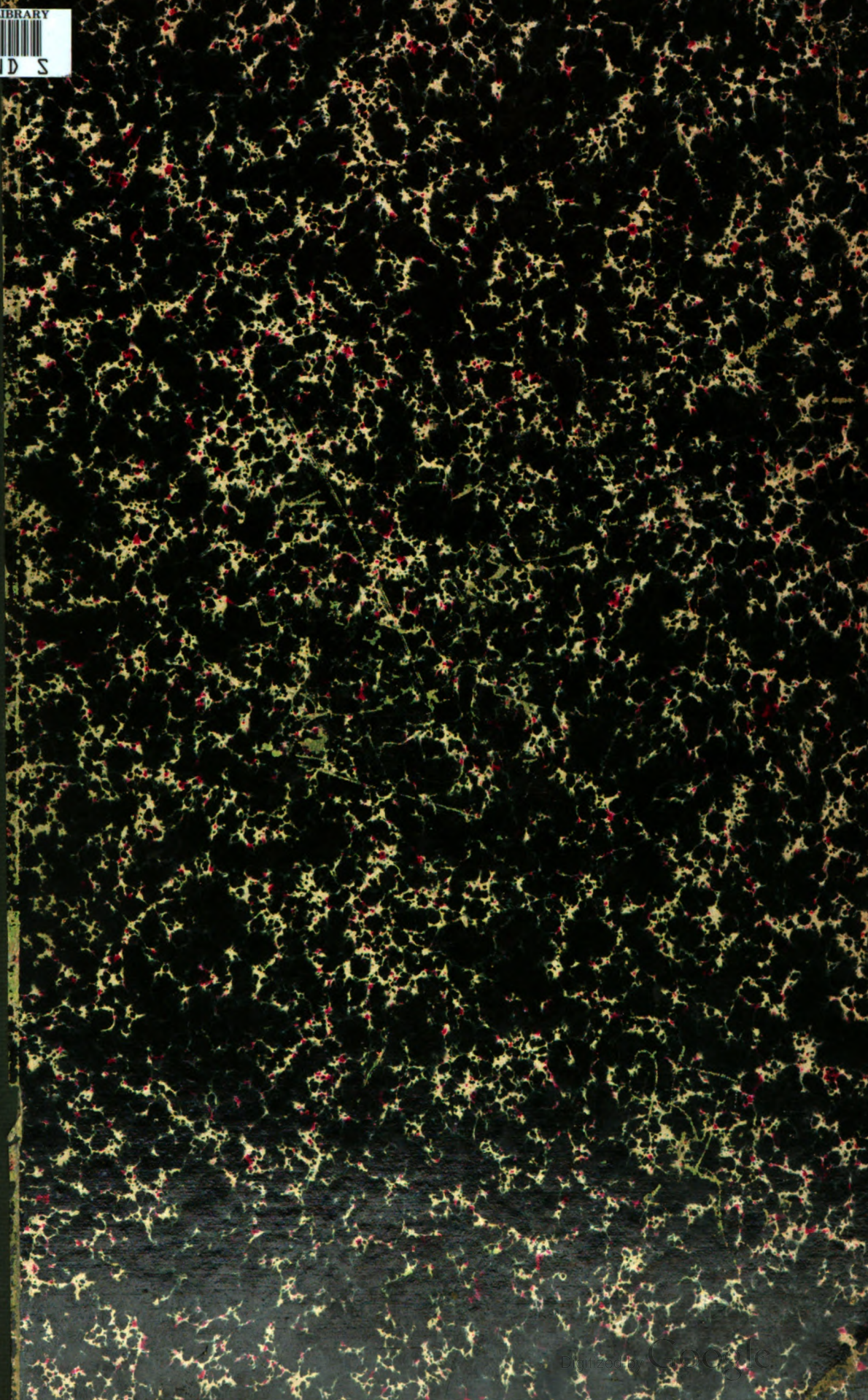
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NO. 1

## THE TREATMENT OF FRACTURES.

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### INTRODUCTORY.

Several fatalities have been reported by experienced surgeons, following the open method of treatment of fractures. The procedure is, therefore, worthy of careful deliberation. Let us, then, pause for a moment, first to consider the merits of the closed method: Based upon the observation of a large number of cases, in which the open and the closed methods of treatment have been contrasted in order to arrive at some definite conclusion—cases as far as possible of like character and severity, involving corresponding bones and treated as far as possible under the same circumstances otherwise, I am of the opinion that the closed fracture *in cases in which it can be properly kept as such*, always unites more quickly than the closed fracture treated by the open method. This has been unquestionably true in several cases of closed double fractures, notably one very severe trauma involving both the long bones of both legs caused by the fall of a steel beam upon the crossed legs of the patient who, at the time of the accident, was sitting on the floor of a building under construction. The x-ray showed strikingly similar comminuted fractures of both bones of both legs. One leg was treated by the closed method, the other by the open method and plating, with the result that the closed fractures were consolidated four weeks before the corresponding bones treated by the open method. This was the nearest approach in my own experience to the logical conditions and requirements necessary to form any accurate idea as to the relative value of the two methods of treatment. It is reasonable to suppose that the additional trauma—although made under the strictest of aseptic precautions—of opening the tissues of one of these two limbs and the use of the steel plate therein was the direct cause of the difference in time of the consolidation of the bones of the two legs; in other words, that the trauma of operative pro-

cedure and the application of a foreign body are two of the chief factors in the production of delayed union. In the case cited, I could not suppose the delayed union due to muscular or fascial intervention, for I had taken deliberate pains to prevent this by securing an absolute anatomical reduction. And no one can doubt that anatomical reduction is one of the chief factors in quick repair and functional perfection. I am forced to believe, therefore, that the conservative treatment will, in many cases, yield results as good as, and often better than the radical method, and this in shorter time, in every case of approximate anatomical reduction, *in which it is possible to secure it*. Even in cases of rapid union following operative procedure union would, I believe, be still more rapid in the same cases could the trauma of operations have been avoided.

Delayed or non-union is a frequent complication in fractures of the femur, humerus and tibia, especially those subjected to the open method of treatment, and more especially those in which foreign bodies, like steel plates, have been employed, whether blood clot and tissue fragments—commonly termed the stimulus for osteogenesis—have been removed or not.

Let us observe then, in passing, that operative intervention alone, without the employment of a foreign body, may retard bony union. Indeed, delayed union or non-union following operative procedure is even more common in fractures of the femur than in those of the tibia, simply because of the greater trauma necessary in the former—a larger bone, a deeper wound, a greater disturbance of tissues. If this be true, and it certainly appears so, then the greater amount of foreign matter employed in fixation, because of the greater traumatism necessary therefor, the greater the dangers—not only of infection and of pressure necrosis, but also of delayed union or non-union, and for this reason a wire is better than a steel plate, and to use neither, when it is possible to avoid them, is better than to use either.

Mr. Lane holds that the steel plate hastens consolidation. This has not been my experience. On the contrary, excellent fixation though the plate makes, in many cases, indeed, it actually retards



consolidation, in cases, too, in which the soft structures have healed by first intention and presented not the slightest evidences of infection. Bony union of the femur, following ten weeks

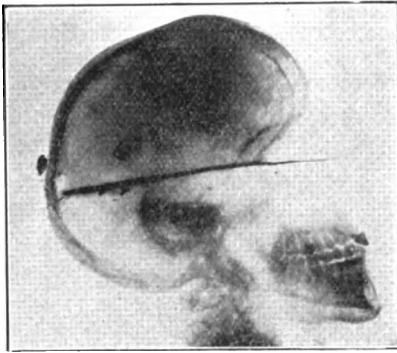


Fig. 1. Gunshot wound of skull, 38 caliber pistol ball; bullet split in six fragments, one without the cranium, five scattered within the brain substance. (Probe placed against scalp to aid in localization.)

after steel plating, will probably be as far advanced in six or seven weeks in the absence of any foreign body whatever.

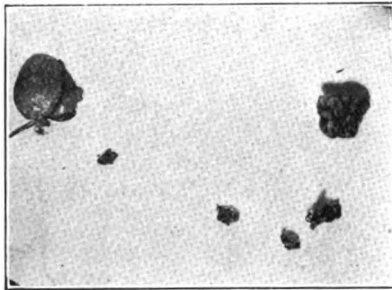


Fig. 2. This shows all fragments, as seen in Fig. 1, removed—an exact verification of the x-ray finding in Fig. 1; uneventful recovery of patient.

We know, on the other hand, that non-union is not a rarity in the closed fracture treated as such and in good apposition, a fact due some-



Fig. 3. Fracture of the surgical neck of the humerus, with marked displacement of fragments.

times to too active motion, sometimes to muscular intervention. And, by way of contrast, we may observe that a slight motion permitted

in the hitherto motionless patient, without union, will simulate consolidation. We know, further,

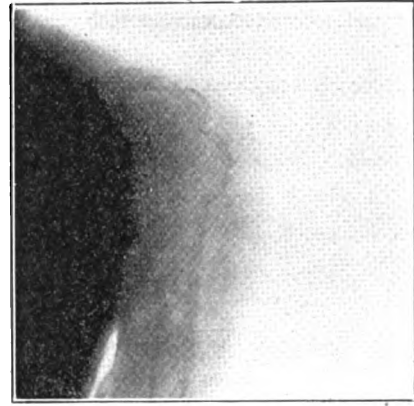


Fig. 4. The same as Fig. 3 reduced and wired.

that callus formation will progress in the presence of a mild infection, not because of it, but in spite of it; while infection of a severe grade

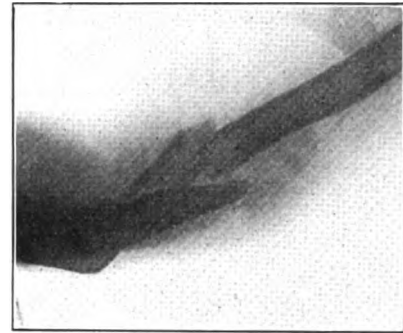


Fig. 5. Patient fell from wagon, striking arm on cobble stone, causing compound fracture of humeral shaft, with angular displacement through rotation of detached fragment.

will check callus formation altogether. And we are all agreed that sepsis is the greatest of all factors of failure in bone surgery.

The open method has a legitimate field of its own, however, viz., that in which coaptation can not be secured and maintained without it. But

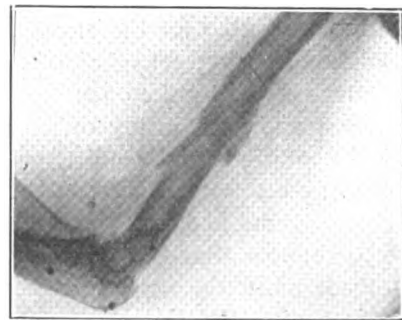


Fig. 6. The same as Fig. 5 reduced and wired.

I should like to join with those who protest against it as a procedure of routine. There are cases in which its propriety is unquestioned and

unquestionable; there are others in which equally good results are obtained by the closed method.

We should observe further that the difficulties in the treatment of fractures increase, as a rule, as the age of the patient increases. The child's case presents fewer difficulties than that of the young adult, and from the latter we may expect



Fig. 7. Patient, female, sixty-five years old, fell down steps, causing fracture of the femoral neck.

much less anxiety than from a like condition in the aged.

The ideal treatment of fractures is that which effects, by the closed method and without recurrence of displacement, an anatomical reduction. The second best procedure is that of the open method by which reduction is secured and maintained without any foreign body whatever; the



Fig. 8. The same as Fig. 7 reduced and fixed. The screw, preceded by the drill, passes obliquely entirely through the length of the bone from the subtrochanteric point of entrance into the femoral head. Excellent functional result.

third, that which gives anatomical reduction which is maintained with the least amount of foreign material for fixation. This last, however, is a wide and legitimate field for operative treatment, the condition being one, as we have observed, in which coaptation can not possibly be secured and maintained without it, and it is this

phase of the subject to which I would now invite attention:

#### THE OPERATIVE TREATMENT OF FRACTURES.

The operative treatment of fractures may properly be considered under two headings: 1. Simple or closed fractures; 2, those which are compound or open. As between Lane and Fritz Koenig,



Fig. 9. A transverse fracture of the patella, in which the fragments were widely separated.

on the one hand, advising operation in every case of simple fracture with considerable displacement of fragments and difficulty in holding them in apposition, and von Eiselsberg and the Viennese clinic, on the other, advocating surgical intervention only in fracture of the patella, we may regard both as extremes, and select the middle course, taking all the cases and all the



Fig. 10. The same as Fig. 9, taken seven months afterward, showing bony union.

circumstances, as they come, as being the wisest, the safest, and the best guides. In experienced hands, however, with hospital facilities and a perfect aseptic technique, I should not hesitate to recommend the open operation where the fragments are widely displaced and apposition without operation is impossible. Under such circumstances the danger of infection is practically

nil, and that of anesthesia, in competent hands, unworthy of serious consideration.

What are the indications for operation in a closed fracture? 1. If complete reduction is impossible. 2. If a fragment or the soft parts intervene. 3. If the condition is a spiral fracture with much separation of the fragments. 4. If apposition cannot otherwise be maintained. 5.

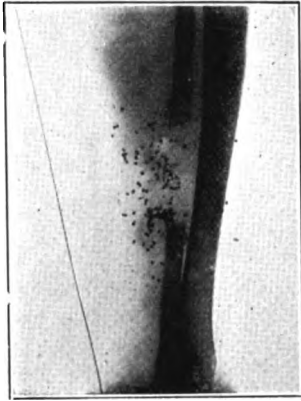


Fig. 11. Gunshot fracture of fibula, four inches of bone destroyed, tibial and peroneal arteries severed; operation at first refused; gangrene, followed by supracandyloid amputation.

Multiple fractures, not too much comminuted. 6. Cases of rotation of the fragments. 7. Evidence of involvement of bloodvessels and nerves. 8. Marked deformity. Many of the most conservative men operate without hesitation upon the patella, the olecranon, and the os calcis.

In articular fractures, those just above the

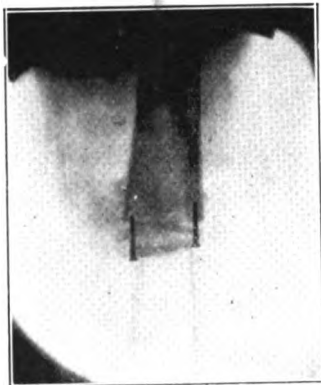


Fig. 12. The same case as Fig. 11, showing molded stump and grafted patella in position, fixed by screws buried beneath fibro-periosteum and penetrating only dense bone. Patient can now (three months after operation) stand the weight of his body upon the firmly united graft without the slightest pain.

joint, those just below the joint, those into the joint, and in cases of epiphyseal separation—whether or not to operate is a nice question. Let us take the elbow joint for example. Any great displacement of fragments here is very apt to result in functional impairment if not in ankylosis. The problem in such cases is very difficult, perhaps the most difficult with which we have

to deal. The operation should not be undertaken except by those of considerable experience, and then only in the presence of an absolute asepsis. Under these favorable conditions, however, with ankylosis threatening, it is unquestionably best to cut down upon, replace and, preferably, suture the fragments.

What are the advantages of the open method?

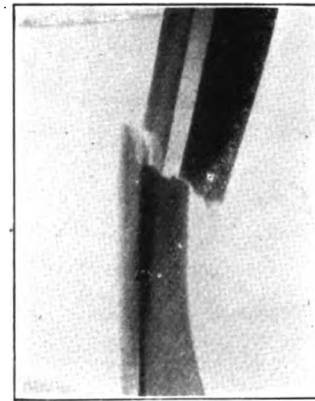


Fig. 13. A closed fracture of both bones of the leg, caused by the patient getting caught under a falling embankment, and found impossible of satisfactory reduction. Treated as a closed fracture because of muscle intervention.

1. Better union; 2. Relief from pressure on nerves and bloodvessels; 3. Anatomically accurate apposition secured and maintained; 4. All interventions, whether bone, muscle, or periosteum removed and non-union therefrom prevented; 5. In articular fractures, whether the supraarticular,

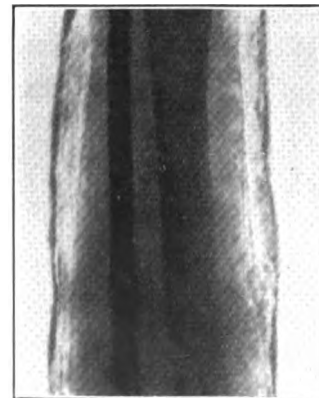


Fig. 14. The same case as Fig. 13, cut down upon and reduced. Note the exact coaptation of the fragments and plaster-of-Paris cast. This is an instance of the second best procedure—that of the open method by which reduction is secured and maintained without any foreign body whatever.

infraarticular, circumarticular, or epiphyseal separation—there is vastly less danger of ankylosis.

After a fracture, when should we operate? It has been maintained that the best time is at the end of a week or ten days, the reason given being that then callus formation is most active, that blood clots and tissue shreds have begun to be absorbed. I believe in the earliest operation, if

operation is indicated at all. I believe further in washing out blood clots and tissue shreds and bringing the soft structures into the closest approximation to the bone, for elimination of dead spaces and for splint effect, rather than the reverse, and rather than imposing upon the system this unnecessary task of absorption, to say nothing of infection.

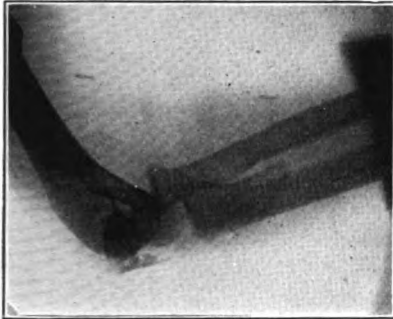


Fig. 15. A compound multiple fracture and dislocation at the elbow joint. Patient, a railroad employee, was struck on the elbow by a shifting engine.

How shall we treat compound fractures? It is most difficult to believe that it has been less than half a century since the surgeon had to choose between immediate amputations or death from infection; most difficult to realize that the mortality in such cases has fallen from forty and fifty per cent. to nine per cent., and even this is yearly growing less. Can the profession ever fittingly record its indebtedness to the immortals—Pasteur and Lister?

If the bone is extensively comminuted and irreparable damage to the main structures—vessels,

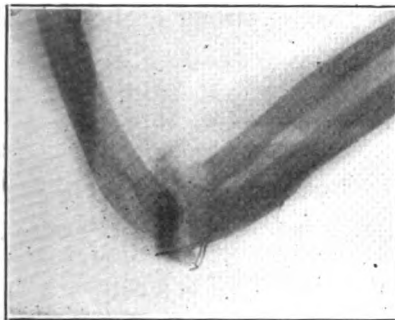


Fig. 16. The same as Fig. 15. Note the wiring of the comminuted olecranon process and fracture of the ulna shaft. Put up in acute flexion. Passive motion and massage were begun on the 14th day; functional result excellent.

nerves and muscles—exists, primary amputation is indicated and should be immediate if the patient's condition justifies it; if not, then we should ligate the main vessels, thoroughly cleanse the wound, apply an aseptic dressing, and await re-action.

If amputation is not indicated, it is well to observe the following precautions: 1. Thorough

disinfection of the wound surfaces, cutting away contaminated skin edges; 2. If suspicious of infection, irrigate with 1-1,000 bichloride of mercury solution, or with 70% alcohol or paint with tincture of iodine; 3. The fragments which project



Fig. 17. A spiral fracture of both bones of the leg, with very great displacement of fragments. Patient's ankle was caught in a revolving belt.

through the wound should be reduced; if necessary, resected; 4. If much displacement, suture the fragments; 5. Otherwise treat the open as you would the closed fracture.

Next, the wound itself should be cleansed of all freed particles of bone, dirt and blood clot. If it has been exposed to the dirt of the streets, hence to tetanus, it should be thoroughly irrigated and a prophylactic injection of antitetanic serum should be immediately administered. If



Fig. 18. The same as Fig. 17 after wiring.

the wound is very large, after freshening the skin edges, they should be sutured and always drained. If small, we may dispense with sutures and leave the wound open for drainage.

Trendelenburg closes the wound completely after disinfection. This method is certainly to be condemned as a routine measure. Aseptic, occlusive, gauze and cotton complete the dressing. Extension, immobilization, the use of splints and

casts are similar to their application in a closed fracture. For immobilization the moulded plaster splint is excellent, or the circular plaster cast may be applied, split through the centre while yet soft, and a gauze bandage placed over this to prevent swelling on the one hand and pressure necrosis on the other.

If gas bacillus or gangrene is present, high am-

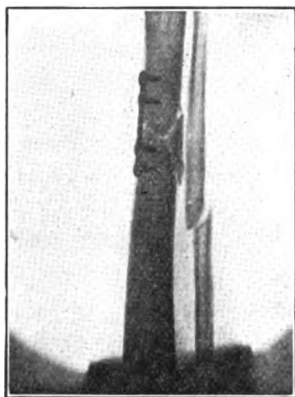


Fig. 19. Fracture of both bones of the leg; fixation of the tibia with the Lane plate. This plate weighed 410½ grains, while the tinned-steel-annealed wire used in Fig. 17 weighed but 8½ grains—actual apothecary weight.

putation is the rule. If infection is apparent and it does not yield to the simpler methods, the wound should be freely opened and drained; or incision and counterincision made, followed by continuous irrigation with antiseptic solutions, such as bichloride of mercury, acetate of aluminum, 3½ per cent. tincture of iodine, 1-5,000

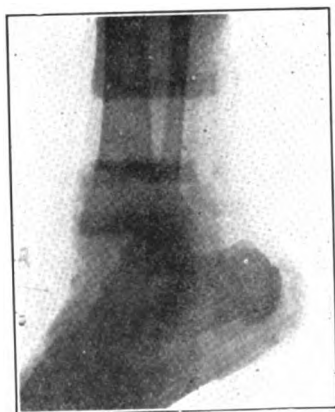


Fig. 20. A classic Pott's fracture with marked backward displacement.

silver nitrate; seventy per cent. alcohol; or the infected member may be treated locally with heat, 220° F., after the method of Clinton, of Buffalo.

Gunshot fractures are treated like any other compound fractures. The surrounding skin should be immediately and thoroughly disinfected. Beyond this, in most cases, the more conservative the treatment, the better the results. If there

are evidences of hopeless shattering of bones and soft parts, vessels and nerves, amputation is indicated. Otherwise the wound should be regarded as clean until evidences of infection appear. Considerable comminution may yet result in a good limb. Many of our present day bullets are aseptic. Their removal, where much dissection is necessary, is contraindicated, except in the pres-



Fig. 21. The same as Fig. 20 reduced and placed in plaster-of-Paris cast.

ence of infection or when they act as foreign bodies or when the x-ray finding shows that they admit of easy removal. A prophylactic injection of antitetanic serum is always timely in gunshot wounds, and if the lungs have been punctured, pneumonia is to be feared, hence vaccine therapy is indicated.

What are the best methods of fixation? Here opinions differ widely. Reposition is insufficient in many cases. To maintain accurate apposition mechanical fixation is necessary. The ideal suture is one that is strong enough to hold until

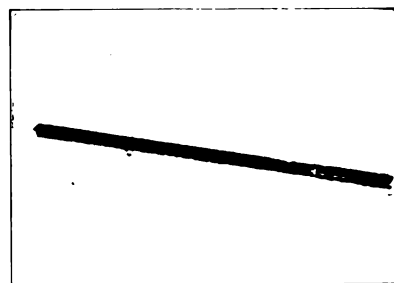


Fig. 22. Author's grooved bone drill. The darker shadow represents the groove. Attached to the flexible shaft of a motor, with cord and fitting for the electric lamp socket, this instrument drills a hole in a few seconds after exact coaptation of the fragments. The wire is then passed through the groove in the drill and the drill withdrawn, leaving the wire for fixation of the fragments and maintaining them in the exact coaptation of reduction. The fragments cannot slip after reduction, for the drill holds them immovably until the wire makes them fast. The operation by the old solid drill, by hand method—uncertain, tedious, slow—is thus rendered certain, simple, and only a matter of a few seconds.

union has taken place and then to admit of its own absorption. Unfortunately we have nothing as yet that can with safety be relied on for this



purpose. The nearest approach to it is the sixty day chromic catgut or kangaroo tendon. The non-absorbable sutures most used are of silver, iron, or bronze aluminum wire. In addition may be mentioned screws, nails, clamps, clips, ivory pegs, etc. In cases of little tension, as in epiphyseal separations at the elbow, the epicondyles of the humerus, fractures of the clavicle, olecranon, patella, tuberosity of the os calcis, the absorbable sutures may be risked.

When there is tension, the best suture is of wire, either a single heavy or a double fine thread. Silver is objectionable because it readily breaks with the twisting of the knot. Bronze aluminum or iron wire has greater tensile strength. For five years past I have been using a tinned-steel-annealed wire, which is the strongest and best of them all.

The method of application of the wire is very important. We may drill openings through the medulla and entire diameter of the bone and, after approximating, twist the suture. We may dispense with the drill and surround the entire circumference of the bone once or several times with the suture and thus hold the fragments together. Necrosis here is an exaggerated fear. We may pass the suture through the periosteum only, as in the patella or olecranon. We may pass through the cortex and into the medullary cavity of each fragment and on one or both sides as desired. Or we may pass partially through the cortex, between the periosteum and medullary cavity, without entering the canal at all. This is perhaps the best method for long bones, for oblique and spiral fractures, and altogether the best method for every bone to which it may be applicable. Lane recommends steel plates and screws. Parkhill recommends a clamp. To all such devices the objection has been very properly raised that they are bulky, heavy, cumbersome, of unnecessary size and weight, which increase the dangers of all foreign bodies with an added danger of pressure necrosis and infection.

The use of plates and clamps is growing less and less every year. The weights of the smallest and lightest Lane plate and that of the smallest wire necessary to hold the same fragments in correct apposition are thirty-four and a half grains as compared to one and three-eighths grains; and the weights of the largest Lane plate and of the largest tinned-steel-annealed wire to accomplish the same purpose, are 591.5 grains as compared to fourteen and a quarter grains—actual apothecary weight.

#### CONCLUSIONS.

The closed method is the method of choice when even an approximately anatomical coaptation can be secured. On the other hand, operation is indicated in the closed fracture of wide displacement and when correct apposition is otherwise impossible, provided hospital facilities can be obtained.

Operation is indicated in articular fractures when ankylosis threatens, and the best results are obtained after exact coaptation and suturing of the fragments. Massage, followed by early passive motion, gradually made active, should be the practice.

When operation is indicated at all, the earliest operation is the best.

The operative treatment for open fractures is that which most nearly reduces them to the type of the closed fracture, except as to drainage.

Gunshot fractures should be treated like fractures of the open type in contact with street dust. That is to say, in addition to the usual treatment we should administer, as a wise precautionary measure, antitetanic serum.

In all cases the most exact coaptation and retention of the fragments gives the most gratifying results.

The ideal suture is one strong enough to hold until union begins and then admits of its own absorption. The nearest approach to this is the sixty-day chromicized catgut, which is unsafe and unsatisfactory in the presence of tension. The most trustworthy metal suture is the tinned-steel-annealed wire. Wiring is the best method of fixation in the great majority of cases.

Because of the dangers of an osteomyelitis the medullary canal should not be invaded if it is possible to avoid it.

The illustrations represent some of the most common as well as some of the most interesting fractures which the writer has had to treat. For radiographing these cases the author is indebted to Dr. Thomas A. Groover.

THE FARRAGUT.

The important considerations in the treatment of fractures are, at first, relief of pain and reduction of swelling, and, subsequently, preservation of function of the muscles, the nerves and the neighboring joints. Hence the value of early and frequent massage and passive motion, (and in suitable cases, of active motion) and the necessity for avoiding splints that unduly compress the muscles or deprive them of activity.

# DEDUCTIONS FROM OUR EXPERIENCE AT THE HOSPITAL OF THE GOOD SHEPHERD IN THE OPEN TREATMENT OF FRACTURES.

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The experience obtained on the service at our hospital in the open treatment of simple fractures covers a period of twelve years. We feel that this experience, though not large, has been sufficient to justify us in definite conclusions.

Our work, to its present extent, agrees with the findings and injunctions of both the English and American Committees appointed by their respective Surgical Associations to formulate rules to govern the use of the open method treatment in simple fractures. I should like here to call attention to the essential difference in the reports of these two committees. The rules of the English Committee require the surgeon to be experienced and to have suitable facilities for aseptic technic. They disallow the use of the open treatment where reduction can be made without incision. They point to more satisfactory results when undertaken immediately after accident; regard it as commonly unnecessary in childhood because the deformities of early life, resulting from imperfect reduction of fracture, largely disappear with increasing age; and because of its frequent failures, warn against its use in the treatment of old ununited fractures.

The American Committee, on the other hand, in their preliminary report at Washington, before the American Surgical Society in May, 1913, in the first place classified those employing the method of the open treatment in three groups, and then formulated rules appropriate to each of these three classes.

Operators are classified by this Committee as follows: 1. Those inexperienced in the technic and special requirements of open operation; 2. Experienced surgeons, but with poor or only average hospital facilities at their command; 3. Competent surgeons, who have at their command excellent hospital and operating-room facilities, and also have assistants carefully and thoroughly trained in all the details of aseptic procedures. It was only to the last of these groups that the Committee gave sanction for the frequent and free use of the open method. The

first class were barred absolutely, and the second also, except when some peculiarly urgent necessity for the method should exist.

Herein is recognized and emphasized the keynote to the success of these operations: perfect aseptic technic. Success comes only through the association of the experienced surgeon, a properly equipped and conducted operating-room, and trained assistants. The markedly great value of thoroughly trained assistants is nowhere more apparent than when the surgeon undertakes procedures that depend for their success on absolute asepsis. In unusual or new procedures that the surgeon may undertake, however dexterous he may be in his own performance, he cannot completely control the untrained assistant whose enthusiasm represents his curiosity rather than his eagerness to contribute to success.

The evils that come from inexperienced and inadequately trained assistants are in constant evidence in every hospital where internes recently graduated from college and frequently changing, assume the role of surgical assistants. In operations such as this under consideration where asepsis is absolutely essential, the assistants should be selected because of their adaptability, previous training and intelligent apprehension of their duties. We have found for such operations success better assured by the use of only one assistant properly trained even if some time is lost and the operative procedure rendered a little more difficult, than of more, some of whom are known to be lacking in the prerequisite experience and ability.

I emphasize this particularly because in a recent book on the principles of surgery just received for review, in referring to open methods of treatment of fractures it says: "It is the method of choice in fractures of the larger bone and can be done *easily and safely* by *any one acquainted* with his anatomy and with aseptic methods." I have used italics in the above quotation to call attention to a statement which is to be deplored.

At first the open method of treating fractures was employed almost solely for the purpose of holding in apposition the fragments that could not be kept in place by the use of splints and extensions. For this purpose foreign material such as silver wire was employed, then Lane's plates came into use. Here was a great advance. Through the experience and knowledge gained in these operations we gradually came to an appreciation of the true causes of our inability by the older method to properly reduce fractures

and to keep the fragments in good apposition. Instead of muscle pull and muscle contractions being the primary faults, they are secondary complications and cause the deformity because of the imperfect position of the fragments. By open incision we found the failure to accomplish reduction was most always due to the interposition of extraneous tissues, as fascia and muscle, and the inability to apply splints and extension so as to prevent overriding and deformity was due to the failure to first properly reduce the fracture. By the removal of the hindrances to apposition, reduction of fragments and their permanent retention in place became possible. It was the imperfect reduction and not the muscle contraction that was responsible for the failure of outside splints and extension. Suturing of the periosteum and surrounding tissues is often sufficient to insure against redisplacement; or, if the plane of fracture is unfortunate, kangaroo tendons wound around the fragments or passed through drill holes may assure the fixation. From this we have come to the conclusion that each case submitted to operation should still be carefully considered after complete reduction through incision before resorting to the use of a plate or bone implantation as well. We believe that in many cases after the fragments have been successfully put into apposition through open incision, outside splints and other simple means will suffice to hold them in place. Relieved of the necessity of introducing a non-absorbable foreign body, we eliminate the most dangerous element in these procedures. So many and great are the objections to the use of plates that we have given them up entirely. In our experience the necessity of subsequent removal of plates for all causes has been in 75% of the cases, and this per cent. in the old cases grows as time goes on.

The use of plates instead of wire was introduced in fracture treatment to secure absolute immobility of the fragments. In spite of the advantages gained in the ambulatory treatment of fractures apparently through the stimulation to greater bony growth at the point from the irritation caused by the slight motion induced, absolute immobility is of real advantage. It is the early functional use of the limb as a whole, and not irritation by movement, that is of importance. The use of plates, especially metal plates, necessitates more delay in returning to the normal use of a part because of the danger of the bending of the plate and the possibility of the strain loosening the screws. When these accidents occur removal of the plate becomes

necessary. Good early bone union is therefore delayed of necessity through the prolonged restraint when plates are used and this is sometimes the real cause of non-union. I cannot escape the conclusion that bone atrophy, as shown by the *x*-ray following fracture, like the atrophy of muscles, is due to disuse of a limb, and to this in turn is due in large measure poor and delayed bony union. We have come to employ very early, as soon as the active signs of inflammation have subsided, passive motion and moderate pressure in the bearing strain line, and we begin active motion correspondingly early. It is hard to say just when, as each case is a law to itself, but active use is usually permitted from the twelfth to the twenty-fourth day. If the radiograph and manual examination do not show satisfactory progress in healing, thyroid extract is prescribed. We are convinced of the usefulness of this remedy to stimulate the formation of callus. The injection of iodine at the seat of fracture is also to be recommended. Bier's injection of the patient's blood between the bone ends, though new to us, seems scientifically proper. His good results from this method of treatment coincides with our theory of the explanation of why open operations undertaken immediately or very soon after the injury are more successful than are those done some time after the time of injury. A blood clot between the fractured ends is essential to proper bony union. In the operation it is the practice to carefully remove all old blood clots and unless the break is recent or the end freshened by recutting, there will not be formed a new blood clot from hemorrhage.

Our theory respecting the part played by the blood clot may be expressed as follows: specialized tissue structures other than connective tissue require a definite space or channel for their growth. For example, regeneration of nerve occurs only when the divided nerve ends have been brought in apposition, or, if too far separated, the tract between them is kept open by a tube or if not by an actual tube by some material that is absorbable which by the proliferation of the surrounding and ensheathing connective tissue accomplishes the same end. A blood clot acts in this same way by organizing and then allowing any specialized adjacent tissue to replace it or proliferate itself into it. On the other hand, connective tissue formation derived from any tissue other than the bone, that is to say, growing in between the ends of the bone from the surrounding tissue will remain simple con-

nective tissue or organized to its specialization, but will not become osseous. The periosteum of the bones themselves seems to act in this capacity as a sheath for proper bony growth within, rather than to be actually engaged in the formation of osseous tissue.

Through the routine and early *x*-ray examination after each attempt to reduce a fracture by manipulation, we have frequently observed where complete reduction has not been obtained that greater deformity and greater displacement was the result. This is due to the fact that displaced fragments are retracted by muscular contraction until they become fixed in the adjacent soft tissues. Each time that manipulation is performed the pocket in these tissues is torn and loosened, and if the end or ends are not properly apposed, mechanical restraint will not be successful and they will slip back into the enlarged pocket. This results in greater displacement. This offers a good reason for the open operation. If for any reason operation is not admissible in a given case, manipulation for reduction should be very carefully considered and the patient should be made aware that if unsuccessful greater deformity will probably be the result. On the other hand, if open operation is permissible and complete reduction is not obtained by manipulation as shown by physical and *x*-ray examination, 24 to 48 hours later, open operation is urgently indicated.

**CONCLUSION.** We hold that the open treatment of fractures is more scientific and gives more satisfactory results than the older method in those cases where complete reduction cannot be immediately accomplished and maintained; that the dangers of open treatment lie only in faulty technic; that excepting where it is necessary to bridge in a gap, foreign material other than sutures should not be introduced; that when such foreign material is necessary bone from the patient himself is best; that all cases should be examined at regular intervals with the *x*-ray to determine the amount and extent of callus formation, and when failure in such formation is manifest in spite of early manipulation, strain pressure and massage, known therapeutical and mechanical means to induce local hyperemia and promote bony deposits should be employed.

Fractures of the metatarsal bones may be produced by slight injuries. Thus, the base of the fifth metatarsal may be fractured by a twist of the foot while walking or dancing.

## CONSERVATION IN THE TREATMENT OF FRACTURES.

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Conservation in the treatment of fractures must take into consideration not only how best to restore the continuity of the bone involved but also how to do it with as little suffering and inconvenience of the patient as possible, and with the shortest possible period of disability, and with the best final result.

Therefore in beginning the treatment of every fracture the surgeon should consider,

- 1st. What is the best treatment for this particular bone, considered as regards (a) the individuality and physical condition of the patient, (b) the environment of the patient, (c) the actual fracture itself.
- 2nd. What method of treatment will give the patient the least suffering and discomfort after reduction and fixation.
- 3rd. Which will be the method most likely to result in the shortest disability of the patient and give him afterwards the best final functional result.

*First, What is the best treatment for this particular fracture considered as regards:*

- (a) *The individuality and physical condition of the patient.*
- (b) *The environment of the patient.*
- (c) *The nature, location and condition of the fracture itself.*

(a) Before everything else I have advisedly placed the consideration of the *patient himself*. That is to say, the determination, if possible, not only of the actual physical condition of the individual as regards his general health and his reaction to the trauma, the amount and degree of local injury, but also his temperamental peculiarities and habits.

It would obviously be highly improper to treat a very old or a very young patient as one would a young adult; or a very weak and organically diseased person, as one would a strong, healthy individual.

The first thing to do, therefore, in beginning the treatment is to make a careful general physical examination of the patient. Note all organic lesions and evidences of improper or delayed development, or marked signs of senility.

Old people, whether senile from the degeneration of very many years or the effect of some dyscrasia, notoriously are intolerant of confinement to bed and all that it means.

Conservation requires therefore that this class of patients shall be treated by some method which will

free them from the bed very soon, immediately if possible.

Again, old people as a rule do not endure severe operative procedures and all that may follow severe operations. Open methods are not the methods of selection for the treatment of fractures in this class of patients.

One is almost of a necessity brought to the selection of some fixed dressings which may enable the patient to be taken out of bed, and which will so control the affected limb while he is out of bed that no great or persistent suffering will result.

The bones of very old persons unite very slowly, if at all, their soft tissues are rigid, even fibrous tissue is very slow to develop between the ends of the fragments. The fractured ends become encysted in a cavity formed by the deep muscles, fascia and extravasated blood clot—in many instances, without any attempt at union or callus; rather, atrophy takes place. The result is very considerable mobility of the fragments, and until the cyst cavity is formed laceration of the muscles and fascia takes place whenever motion occurs. Result; pain, restlessness, lack of sleep, rapid loss of flesh and strength. Immediate fixation is therefore necessary but it should be *by light molded splints*.

These cases cannot endure irritating pressure nor do they tolerate very heavy apparatus. Well-fitting molded splints of leather reinforced by light (aluminum) metallic strips or bars, I have found best in these cases.

Young children always do best with fixed molded splints. Plaster of Paris makes the ideal dressing for them.

The disposition of the patient should also influence the choice of method of treatment and the selection of splints. Nervous, very irritable people do not tolerate long periods of extension by the ordinary methods of traction usually employed, nor do they endure confinement to bed as well as calm and phlegmatic individuals do.

Especially must one take into consideration the systematic effect of the trauma in selecting and applying methods of treatment. A fracture of one of the chief long bones sometimes produces very severe shock. The injury is always exceedingly painful. The "noci association" of Crile intensifies and sometimes prolongs this shock for many hours. Therefore to set about prolonged efforts at reduction of the fracture or the application of apparatus which itself will be painful, during this period, would be very bad for the patient and extremely bad judgment on the part of the surgeon.

The extremity should, with the utmost gentleness,

simply be fixed in the position of deformity by some temporary splint or dressing (for the lower extremity an old fashioned fracture box, or sand bags serve best) until full reaction takes place, then the formal reduction may be made and the permanent dressing applied.

This injunction in regard to these conditions of extreme weakness and suffering from the fracture seems so elementary and trite that I would not think it necessary to emphasize it but for the fact that I have very frequently seen physicians forget or neglect to observe it. Not only do "green internes" in hospitals forget it, but physicians of experience who ought to know better neglect it.

In an investigation of 788 cases of fracture of the shaft of the femur, I found that of the 27 deaths reported, 5, or over 22% of all the deaths, occurred from shock and exhaustion.

Illnesses of whatever kinds, dyscrasias and specific infections must of course receive consideration and will markedly modify the treatment.

#### (b) *Environment.*

The surroundings, housing and etc., must have very great influence in the selection of treatment for fractures. These markedly influence the result of treatment too.

One should hesitate to criticise the result in any given case of fracture until he knows the surroundings and conditions with which the attending physician had to work.

Very different methods must be employed in treating a fracture of the femur, say in a remote country house, having only the old-fashioned broad beds and usual furnishings and means of a house of a small farmer, from those employed in a first-class hospital or in the modern home of a rich city dweller.

Notwithstanding the exaggerations and positive errors of skiagrams taken by ignorant or unskilful persons, it is nevertheless a fact that a skiagram properly taken by a competent operator serves as the best guide to determine the relative positions of the fragments in cases of fractures, and is the best record of proper or improper adjustment of the fracture. Therefore a physician who is obliged to treat a fracture without the advantage of an x-ray machine should have his results judged by a different standard than those of a surgeon who has the advantage of a well equipped x-ray laboratory. This fact it seems to me ought to be brought out very prominently in medico-legal investigations and in suits for malpractice.

#### (c) *The nature, location and condition of the fracture itself.*

A thorough examination of a fracture should

be made only when the surgeon is prepared to apply the necessary fixation apparatus after reducing the fracture.

To obtain a proper idea of the position of the fracture, the nature of the fracture, and the displacements of the fragments requires manipulations which cause very sharp pains and it is an exhausting process for a nervous and very sensitive person. Unless it be necessary in a consultation or for some other well defined purpose which concerns the well-being of the patient it is not necessary in the preliminary examination for the purpose of giving first aid and applying temporary dressings to make the patient endure the agony of a thorough examination for the purpose of making an accurate determination of the nature and position of the fracture. This is all the more to be avoided if the patient is to be transported some distance.

The injured limb should be fixed *in the position of displacement*, after ascertaining that the ends of the fragments are not so located that they will be apt to injure the skin or large bloodvessels or nerves. The patient should be carried to the place where he will receive permanent treatment; *then* a careful examination should be made but with the utmost gentleness and care. Rough and inconsiderate handling always exaggerates the pain and the apprehension of the patient, this in turn provokes spasm of the muscles of the injured member and renders examination and reduction much more difficult. Having determined the fracture and displacement, immediately the proper splints and fixation apparatus should be prepared. These splints, etc., should be selected for each individual case and should be adapted to the case in hand in every instance. That is to say, a case of fracture of the middle of the shaft of the femur, for instance, should not have applied to it doctor A. B. or C.'s splint for mid-thigh fractures, or the latest recommendation for extension apparatus for fractures of the middle of the femur simply because these have been recommended as most efficient in such cases by their distinguished and experienced advocates.

Every case of fracture differs as much from every other case of fracture of similar location as do cases of pneumonia which involve similar areas of the lung in different individuals.

*In short, the fixation apparatus must be adapted to the individual case, and not the individual case to the apparatus.*

I have the greatest difficulty in making my internes and assistants grasp the full importance of this maxim. Hence, I emphasize it on all occasions and opportunities, as I believe physicians generally

may also not be thoroughly impressed with the vital importance of it.

It is of the greatest importance, therefore, that an accurate determination or diagnosis be made of the direction of the fracture, as regards the axis of the bone, viz., whether transverse, oblique, longitudinal or spiral; the displacement of the fragments and their relative positions as regards the longitudinal and transverse axis of the limb, and whether the fracture is simple, comminuted, multiple or complicated, and whether the fracture is complete, green stick or impacted. It goes without saying that it is most important also at once to diagnose a compound fracture. While this usually is easy, in a few cases it will be very difficult to determine. Sometimes small lacerated wounds of the skin and fascia seem not to involve the soft tissues to the bone when actually by devious routes they do. *When in doubt treat such cases as compound fractures.*

To determine all these points, manipulation and palpation for an experienced surgeon may suffice for a fair degree of accuracy, but for the family practitioner and the occasional handler of fractures it will be far better to have a skiagram made by a reliable Roentgenologist. Indeed I think no surgeon now-a-days ought to treat a fracture of an important long bone without the benefit of a skiagram.

Careful measurements should be made, though it is well known that extremities, especially the lower extremity, vary very considerably in length and development in their normal condition. Careful inspection of the fellow-member should also never be neglected, if it has not been injured, to determine the proper contour and direction of the limb and in order accurately to gauge the distortion of the fractured extremity.

In many instances it will be necessary to employ general anesthesia to make a thorough diagnosis. As this will be necessary in most cases in order to "set" the fracture a surgeon should always be prepared to use ether when called to care for a fracture.

Having accurately diagnosed the nature and condition of the fracture and having everything ready for the reduction the surgeon must decide what, under the circumstances, will be the best treatment for the individual case. This sometimes will be comparatively easy; at other times it will be extremely difficult.

I have been obliged to try in some cases several methods before I found the treatment and apparatus which seemed to fit the conditions of these cases.

General anesthesia, unless there be some contra-indication, should be employed in reducing nearly



all the major fractures. Indeed, in very few cases is it possible to reduce the fracture without the relaxation and freedom from pain which narcosis procures.

Transverse fractures of the long bones, when accurately reduced, may confidently be placed in a rigid molded splint. Plaster of Paris I have found quickest and best for making these splints.

Fractures having a short obliquity with deep notches or "shoulders," also may be treated by plaster of Paris splints when accurately reduced.

Very oblique fractures with comparatively smooth bevelling along their fractured surfaces require, as a rule, continuous extension with lateral coaptation devices, at least for a time.

Fractures about the joints require special positions of the distal fragment in order to meet the usual tilting of the proximal ends. It is impossible to state just what position this may require. Each case, as I said before, varies from all others. Anatomical laws do not apply in many cases of fracture. Varying degrees of injury to the adjacent and attached muscles will entirely prevent, in some cases, the normal traction of the muscles, and the spasm of the muscles which is provoked by the irritation of the fragments will in other cases make distortions quite contrary to the anatomical rule for the cases.

It is therefore a matter of paramount importance to know the relative position of the fragments in every case. Knowing this the proper position may be determined for the individual case.

It may be noted that the statement was made if accurate adjustment of the fragments can be made in certain fractures they may be held by fixed rigid plaster of Paris dressing, properly applied. As a matter of fact, *accurate adjustment of the fragments is practically never obtained by the old conservative methods.* This is not hard to understand and to forgive after one has in many instances seen, by the open method, the fragments entangled in the fascia and muscles, and noted how tremendously difficult it is to unite them even while seeing and handling them by direct traction and leverage of powerful instruments through the open wound.

Then, too, no outside splint or traction device is absolutely reliable. I am convinced, after studying a large number of skiagrams of my own and other surgeons' cases, that reposition of fragments by the accepted methods of traction, viz., Buck's extension and all its variations, Bardenheuer's method (Steinmann's traction hooks have not been used long enough yet to report accurately on them), and the assistance of coaptation splints and devices is *very rarely accurate.*

Properly fitting plaster of Paris splints will hold the fragments and the limb, *if reduction has been made and maintained during the application of the splint.* Unfortunately this, also, is very rarely obtained.

One is brought, therefore, face to face with the alternative of inaccurate adjustments of the fragments and doubtful maintenance of reposition with such results as were formerly obtained, or the employment of the open operation for the adjustment and direct fixation of the fragments, with the risk of infection, etc. Which shall it be?

Lane and his immediate followers and the report of the Committee on Fractures of the British Medical Association (1912 meeting) have given a tremendous boost to the open method treatment of fractures of the long bones.

The Committee of the British Medical Association based its report upon an analysis of 2,940 cases. The operated cases analyzed were only 208. It hardly seems fair to deduce fast conclusions as regards the relative advantages of the two methods from such a disproportionate number of cases. Again, it must be taken into consideration that the operated cases were taken from the clinics of the best equipped and skilled surgeons whereas the non-operative cases were gathered from a much larger and probably more representative list of practitioners.

Summarized, condensed and the order changed the most important conclusions were as follows:—

1st. Although the functional result may be good with an indifferent anatomical result, the most certain way of obtaining a good functional result is to secure a good anatomical result.

(See 1st. paragraph, p. 23 of the report.)

2nd. In nearly all age groups operative cases show a higher percentage of good results than non-operative cases. (1st paragraph, p. 23.)

3rd. No method, non-operative or operative, which does not promise a good anatomical result should be accepted as the method of choice.

Of operative methods those which secure accurate reposition and fixity of the fragments give better results than methods which do not obtain these.

4th. To secure the best results operative treatment should be resorted to as soon after the accident as practicable.

5th. The mortality directly due to operative treatment of simple fractures of the long bones is found so small that it can not be urged as a sufficient reason against operative treatment. (See table X, p. 23.)

6th. It is necessary to insist that the operative treatment of fractures requires special skill and ex-

perience and such facilities and surroundings as will insure asepsis.

7th. (This sums up the whole conclusion and should be carefully noted.) For surgeons and practitioners who are unable to avail themselves of the operative method, the non-operative procedures are likely to remain for some time yet the more safe and serviceable.

Robert Jones, commenting on this report in his presidential address, delivered at the Liverpool Medical Institution (*British Medical Journal*, December 7, 1912), also sums up the whole matter remarkably well in the following sentence.\*\* "Before we reach to new things we must ask ourselves if we have done the best by the old; and it is only by being critics of our own work that we can discover, each for himself, which procedure will in his own hands give the best results."

The Committee on Fractures appointed by the American Surgical Association made a preliminary report at the last (1913) meeting of the association (*Trans. A. S. A.*, 1913).

This committee divided the profession as regards treatment of fractures into three classes and put its recommendations as answers to three interrogations, as follows:

"1st. What should be the routine method for the average general practitioner and those unskilled in surgery as a specialty?

"2nd. What should be the routine treatment for trained surgeons, surgeons with the usual facilities afforded by small or cottage hospitals?

"3rd. What should be the routine treatment for skilled surgical experts with adequate hospital facilities?"

For the first class, which includes all those not trained in surgery as a specialty, the Committee suggests the study and adoption of a routine method midway between that of immobilization on the one hand, and the mobilization of Lucas-Championniere, or the traction method of Bardenheuer, on the other. It is believed that either the method of the French surgeon mentioned or that of Bardenheuer, the German expert, probably will be found to require too much skill, experience and attention to be safe in the hands of those who only occasionally have need to treat the more troublesome fractures. For these general anesthesia should nearly always be employed for the diagnosis and reduction of the fracture, unless *x*-rays are used during the manipulations preceding the application of the fracture dressing. General anesthesia should always be used by such practitioners in the diagnosis and reduction of fractures involving joints. It alone will solve

many difficulties of diagnosis and often simplify the subsequent treatment of the injury.

If reliance is placed upon *x*-ray readings, the study of the skiagraphic plate must be under the direct supervision of a medical man accustomed to both clinical and radiographic examination of bone lesions. The radiographic reports of even expert radiographers alone are not always reliable guides to surgical practice. They must, as other pathological reports, be studied in association with expert surgical experience and clinical observation.

The maintenance of reduction of the fragments should be assured by position, traction, splints or other easily removable apparatus. Splints should be so arranged as to allow easy inspection of the condition of the fragments and soft parts, and to permit early passive and slight active movements. Molded splints of gauze and gypsum or other plastic materials fit and best fulfil the above requirements. The watchwords for this first class of practitioners are general anesthesia, plastic splints or traction, frictions and frequent inspection, early mobility, delay in weight-bearing.

What should be the routine for trained surgeons restricted by the moderate facilities of small or cottage hospitals?

Prolonged immobilization has probably been largely discarded already by most American surgeons, when they take personal care of the entire treatment of a fracture. This is especially true of patients in private practice. Mobilization, less than that advised by Lucas-Championniere, or traction apparatus, to a less extent than that used by Bardenheuer, varying with the locality of the injury, has been adopted by many and probably should be adopted by all such surgeons for the usual run of fractures. One or the other method will probably continue to be the routine at the hands of the class of surgeons mentioned in private practice and in small hospitals with moderate facilities.

This opinion suggests, it will be observed, that the operative treatment be restricted to especially rebellious fractures, known to be such or found to be such, after a very few days' study. This judgment is recorded because of the difficulty under such circumstances of insuring perfect asepsis and sufficient trained assistance.

The troublesome fractures that may with propriety be mentioned as probable candidates for operative treatment are:

Fractures of the surgical neck of the humerus, T-fractures at the lower end of the humerus, fractures of the upper third of the radius, fractures of the upper third of the radius with dislocation of the radial head, fracture of the radius and ulna in the

shafts, especially in adults, fractures of the upper third of the femur, supra-condylar fractures of the femur, fractures of the tibia and fibula near the ankle occasionally. In a general way it may be said that operative treatment suggests itself as the preferable method in any fracture which cannot properly be reduced or retained after reduction.

If operative treatment is the final resource metal plates under absolute asepsis should be used unless reduction alone, or suture, nails or screws are effective. When reduction of fragments is not easily gained or its maintenance is doubtful, plating will be usually found better than wiring. A few cases will not need direct fixation after the reduction has been accomplished through the incision. The operation should be immediate, that is, within a week or ten days after the receipt of injury. It is, in fact, better to operate within a few hours than to delay even a few days, unless shock or other contraindication requires delay. The method selected by the surgeon within the first week should, as a rule, be continued if the surgeon be familiar with both operative and non-operative procedures.

What should be the routine treatment for skilled surgical experts with adequate hospital facilities?

If prolonged immobilization has not been discarded, the surgeon can hardly be termed a skilled surgical expert in fracture treatment. He is behind the times in the surgery of fractures, though he be a recognized expert in abdominal, cerebral, thoracic, or pelvic surgery or other branches of the medical art. To a fracture specialist with the facilities, a sufficient number of trained assistants and the other essentials of a well-organized modern hospital, it makes little real difference in morbidity or mortality whether he select the non-operative or the operative plan. The latter, like all septic surgical procedures, requires more time, more care and more conscientious service at the beginning but makes the after days easier for the surgeon, less painful for the patient, and less troublesome for the nurses.

The time must soon come when metropolitan hospitals will not be considered satisfactorily organized unless fractures are assigned for treatment to specially equipped wards under the care of surgeons particularly interested in the pathology and treatment of these injuries. These surgeons may gain great advantage from the use of the fluoroscope while the adjustment of the fragments is in progress. Gunstock deformities of the elbow, forearms incapable of full pronation and supination, deformed wrists, valgus ankles, coxa vara, and shortened and crooked femurs all too frequently prove the need for increased surgical skill, perhaps

specialism, in the treatment of fractures of the tubular bones of the limbs.

It is probable, though not certain that consolidation of a fracture takes place a little more slowly after direct fixation of fragments than in a well-reduced fracture under non-operative treatment. The statement that the surgical expert will be able to conduct the patient in safety to the point of recovery with good result in most fractures by either the operative or non-operative route is true only provided he personally dominates the situation as to reduction, fixation and after-treatment and sets the time at which the patient shall be allowed to resume his original occupation. Such a surgeon, if of a mechanical turn of mind, will obtain good anatomical and good functional results in many fractures without blood-letting measures. In others he will not fail to recognize early the need for open reduction and direct fixation, nor will he fear sepsis, hemorrhage or shock. Similarly, he will seldom fail to recognize those cases, in which these risks of operation outweigh the benefits likely to be obtained through it. Then some of his patients will be treated by non-operative methods and may perhaps show poor anatomical restoration of the skeleton, as well as bad functional use of the injured limb. They will, however, live.

If, on the other hand, this expert have more liking for operative surgery and a mind less mechanical in its attitude toward fracture repair, he will apply operative procedures to a greater number of fractures than will his colleague above-mentioned. He will, however, equally recognize those cases, in which operative surgery of the blood-letting kind has no place."

2nd. *What method of treatment will give the patient the least suffering and discomfort after the reduction and fixation?*

With an experience of about 200 operated cases, I think I am fully justified in answering this categorically and say undoubtedly if thorough asepsis is obtained the operative method is followed by far less pain and discomfort than the non-operative.

3rd. *Which will be the method most likely to result in shortest disability of the patient, and give him afterwards the best functional result?*

My experience has been that the operative treatment is a little slower than the non-operative as regards the confinement of the patient. I think this is generally conceded by most operators.

As regards the best functional results in after-life, one cannot be so sure about this. Lane asserts that the final results are much better after the operative treatment. For Mr. Lane's cases I have no doubt this is true. I think it is not yet proved in

regard to the operative cases of all surgeons. This is a matter which must be carefully investigated and reported.

Some time ago a surgeon of a large industrial establishment told me that he had noticed that men who had been treated by the non-operative methods for fracture of the femur were never able to go back to their former laborious jobs. If this is true, it should have a very great influence in determining the operative treatment for fractures of the femur at least. While it has never been possible for me with the "floating" character of the patients whom I have treated to keep track of the majority of my cases of fractures, I have observed and known the final results of a sufficient number to be sure that many of my cases have been able to resume fully their former laborious occupations.

It seems to me at the present stage of our knowledge and experience, conservation in the treatment of fractures may best be obtained by following the suggestion so well expressed by Mr. Robert Jones of Liverpool, viz., "Before we reach to new things we must ask ourselves if we have done the best by the old; and it is only by being critics of our own work that we can discover each for himself which procedure will in his own hands give the best results."

#### METAL BONE PLATING A FACTOR IN NON-UNION. AUTOPLASTIC BONE GRAFTING TO EXCITE OSTEO- GENESIS IN NON-UNION OF FRACTURES.<sup>1</sup>

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I have elsewhere<sup>2</sup> expressed the belief that metal bone plates and screws, applied to fractured bones, can, of themselves, be the cause of subsequent non-union. The two cases here recorded, which provide several other interesting deductions concerning fracture surgery, support that belief. Edward Martin<sup>3</sup> states that "As a rule the presence of a plate in place of stimulating osteogenesis between the broken ends, retards it. This retardation is in some places [cases] so great as to entirely prevent union." John B. Roberts<sup>4</sup> reports a case in which his "attention was called to the possibility of plating being a cause of delay in union"; and he quotes

<sup>1</sup> From the Surgical Service of Dr. Howard Lilienthal, Mount Sinai Hospital. The skiagraphs have been furnished by Dr. Jacques, radiographist to the hospital.

<sup>2</sup> Proceedings of the Surgical Section of the New York Academy of Medicine, January 3, 1913, *Medical Record*, June 14, 1913, p. 1100. See also Editorial in this issue.

<sup>3</sup> Martin, Treatment of Ununited Fracture, *Surgery, Gynecology and Obstetrics*, September, 1912 (Vol. 15), p. 252.

<sup>4</sup> Roberts, Operative Fixation as a Cause of Delay in Union of Fractures, *Annals of Surgery*, 1913, Vol. 57, p. 545.

other observers who believe that operative treatment, because of the manipulation of the tissues or otherwise, causes *delay* in union. Albee<sup>5</sup>, quoting Martin, accepts the belief that metal plates and screws may cause delayed and non-union, and advances it as one of the reasons for preferring his excellent bone-graft-inlay operation.

CASE I. F. A., a slender but healthy young nursemaid, falling down an elevator shaft in the summer of 1911, sustained a transverse fracture of the lower third of the left femur, 7 inches above

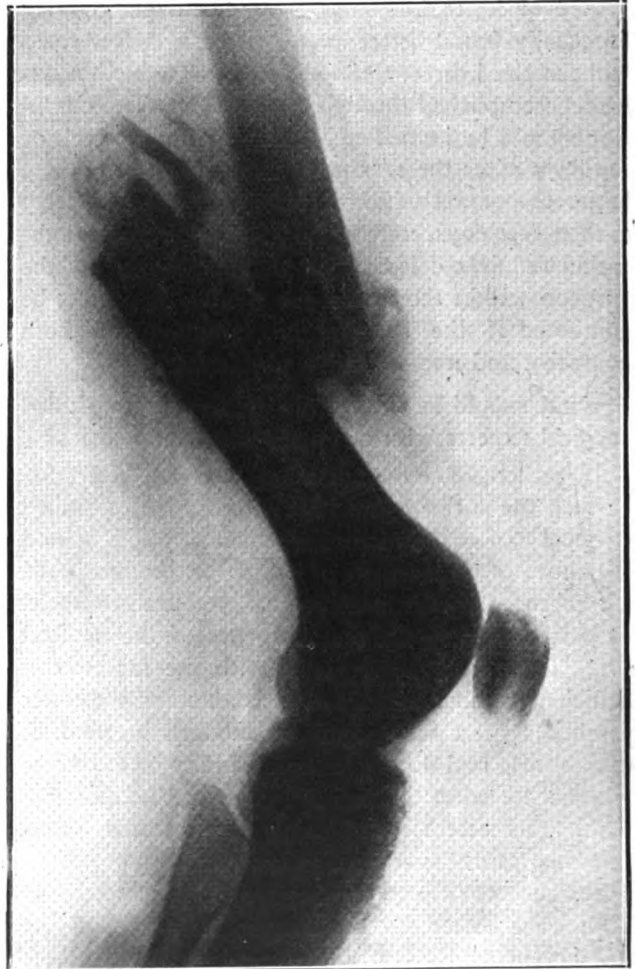


Fig. 1. Case I. Fracture of the lower third of the femur, after six months, (lateral view).

the line of the knee-joint, fracture of the left radius, fracture of the skull (?) and cerebral concussion. Perhaps because her serious condition after the injury prevented active treatment of the femur fracture, it healed with considerable angulation in the sagittal plane and with three inches shortening (figs. 1 and 2).

For the relief of this great shortening of her lower extremity, she was admitted to the surgical service of Mt. Sinai Hospital, about six months later (February, 1912). She was then in good general condition. The knee had a flexion range

<sup>5</sup> Albee, *The Post-Graduate*, November, 1912.

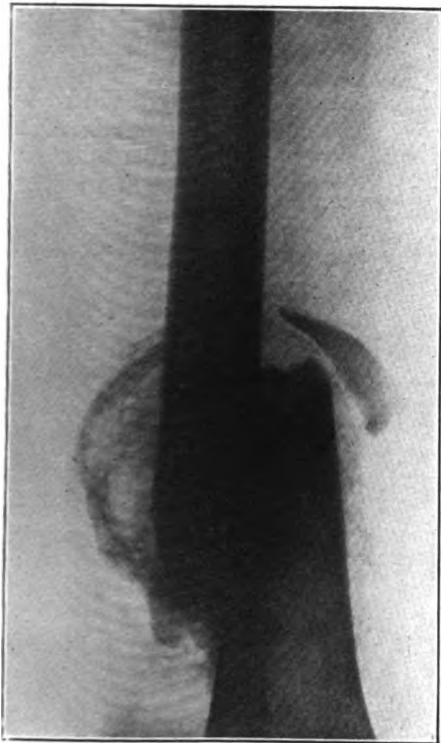


Fig. 2. Case I. The same as Fig. 1. Sagittal view.

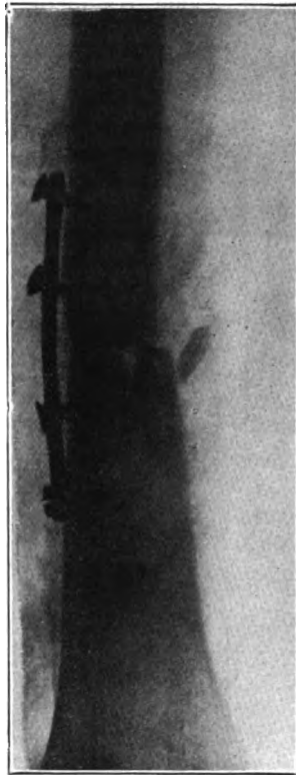


Fig. 3. Case I. After Lane plating. Note the small fragment, which was left undisturbed at operation.

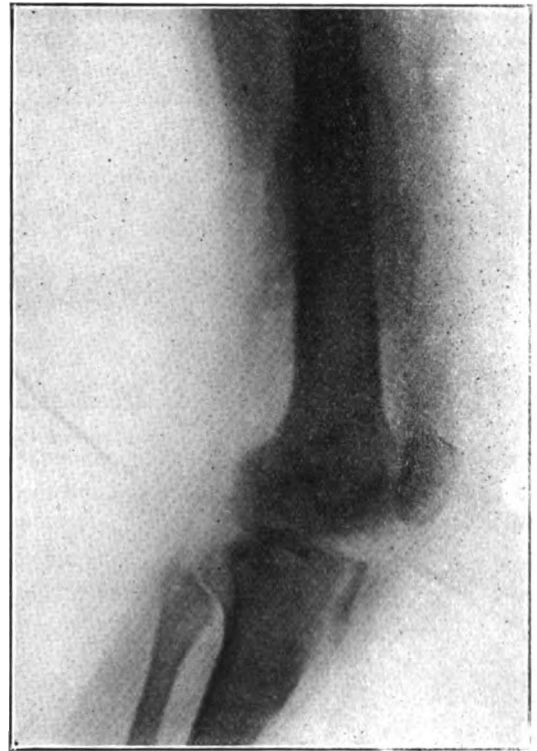


Fig. 4. Case I. Radiograph after brisement forcé of knee. Note avulsion of tibial tubercle and neighboring portion of bone. The bone graft is not seen in this picture (lateral view).



Fig. 5. Case I. A few weeks after the second operation, showing the bone graft, and the callus following first operation that was not disturbed. Note slight adduction of lower fragment.

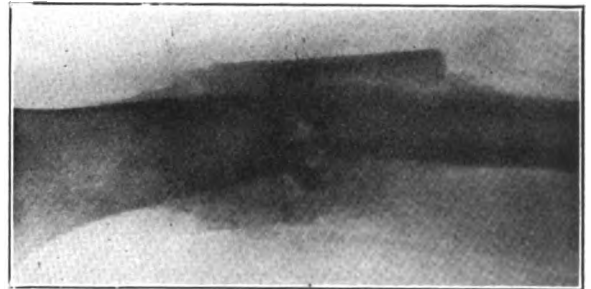


Fig. 7. Case I. Several weeks later. Note beginning fusion of the graft with the femur, and absence of rarefaction or absorption in the graft.

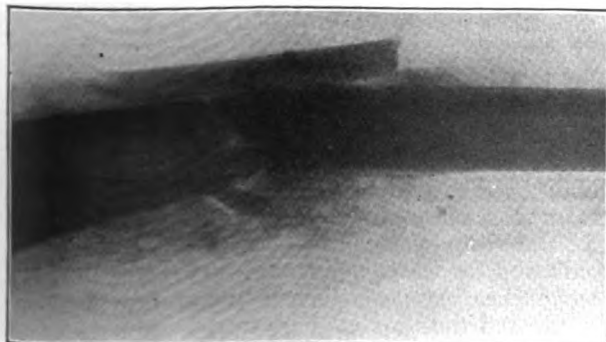


Fig. 6. Case I. A few weeks later.

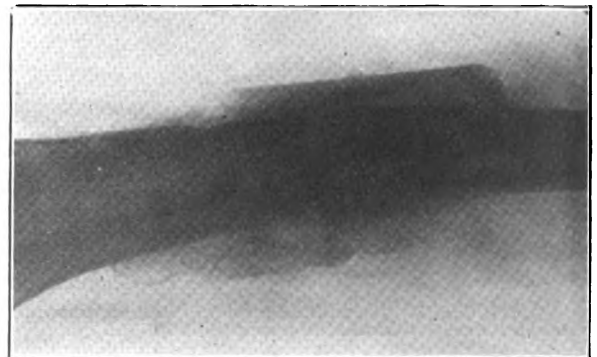


Fig. 8. Case I. Several months after second operation. Bone graft fairly fused to femur. No evidence of its rarefaction or absorption.

of about 45°. The lower third of the left thigh was the site of marked bony swelling and evident deformity of the shaft (as shown in the radiographs). There was, however, apparently solid union.

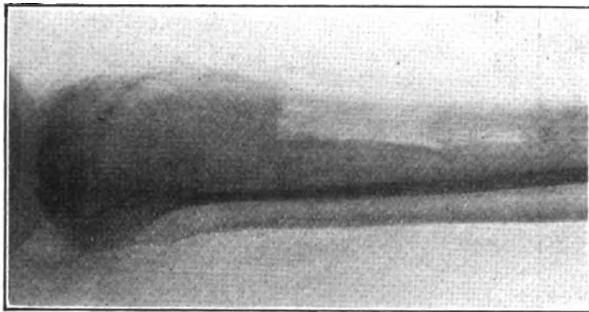


Fig 9. Case I. The tibia a few weeks after removing the graft from it.

On February 29, 1913, I exposed the fracture by open operation. The fairly abundant callus

callus over the ends of the fragments. A small bone fragment was found postero-internally, and this was not disturbed (fig. 3). Because of the much-shortened muscles, considerable effort, by leverage and traction, was required to bring the freshened bone ends into full alignment. This accomplished, a 3 $\frac{5}{8}$ " Lane plate was applied with four  $\frac{3}{4}$ " screws (fig. 3). The muscles and periosteum were sewed over with chromicized catgut, and the skin wound closed. A long spica plaster-of-Paris cast was applied.

There was no undue reaction from the operation, and the soft parts healed *per primam*. After 6

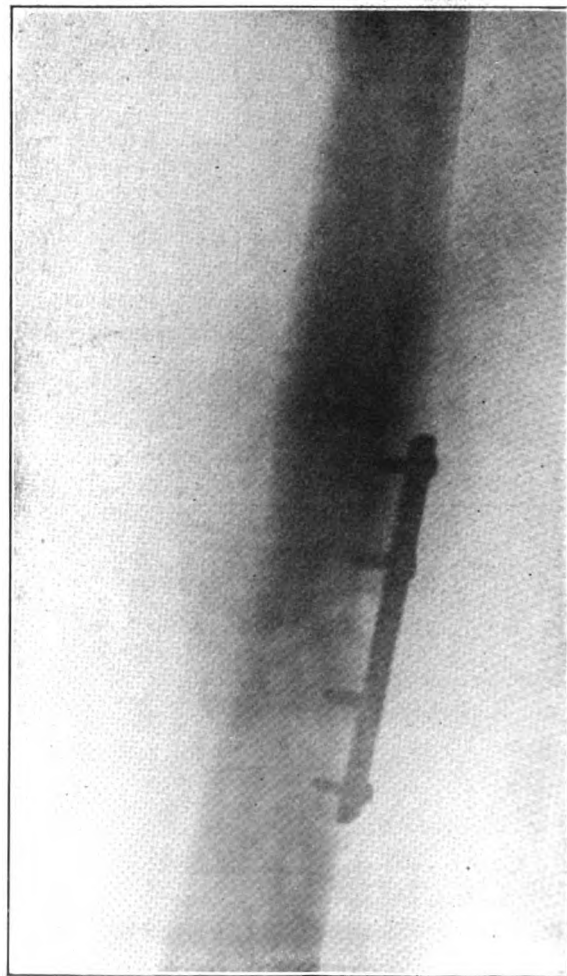


Fig. 11. Case II. Six days after Lane plating. Note the excellent apposition and alignment.

weeks the patient was allowed to walk with crutches, in her cast.

On April 22nd, 7 $\frac{1}{2}$  weeks after the operation, I noticed slight forward bowing of the femur and slight mobility. The patient was put back to bed for several weeks and massage, which had been instituted in the sixth week, was continued. Then she was allowed to walk again, as before. But neither weight-bearing, recumbency nor massage favorably affected the now evident non-union.

On June 17th, about 15 weeks after the bone-plating, I again exposed the femur. *The fragments were in good contact and alignment, the plate and*

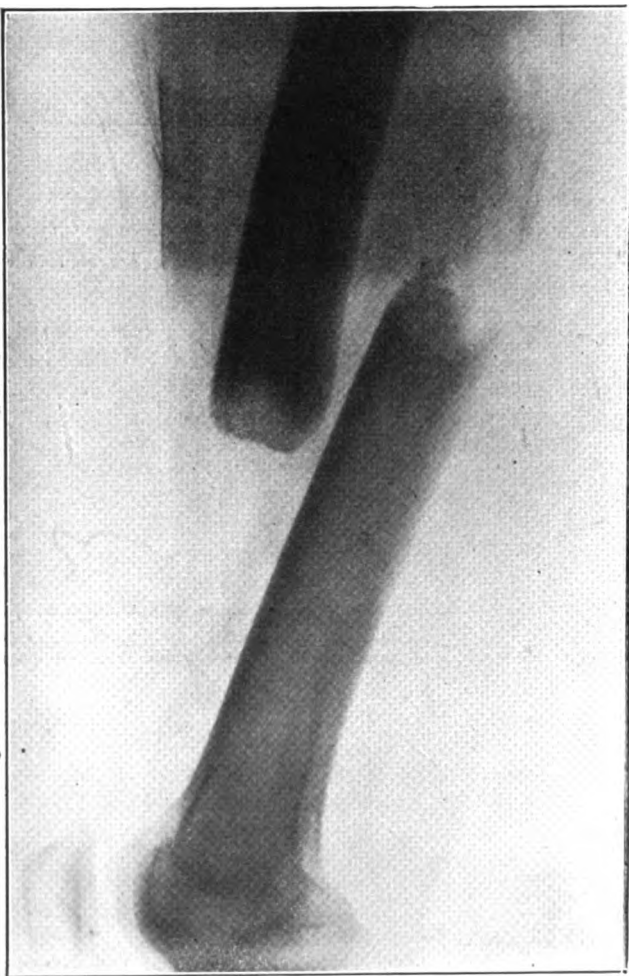


Fig 10. Case II. Recent fracture of midshaft of femur, after attempted manual reduction, and immobilization.

about the shaft contained much cancellous bone, but it was not very solid and was easily lifted away, where necessary, with the chisel. There was little



screws were in place and the latter had loosened but little in the bone. There was, however, very little new callus and none over the ends of the fragments.

I removed the plate and screws and laid over the same site, medullary aspect downward, an osteoperiosteal bone graft,  $3\frac{1}{4}$ " long,  $\frac{5}{8}$ " wide and  $\frac{5}{16}$ " thick, chiselled from the tibia of the same extremity. This was applied merely as an excitant of osteogenesis, not as a splint. No gutter was made for it in the femur, the cortex of which was merely scraped to supply a fresh surface for bone adhe-

under narcosis. With audible snapping of the adhesions, the knee was very gently flexed  $30^\circ$  or less. The next day a small subcutaneous hemorrhage was noted about the tibial tuberosity, and a radiograph (fig. 4) showed that the brisement, gentle though it was, had torn loose a large segment of the tibial head.

To treat this the patient was again put to bed for four weeks, and no further effort was made to loosen the knee-joint.

During the two weeks in which the patient was walking about before she left the hospital, on

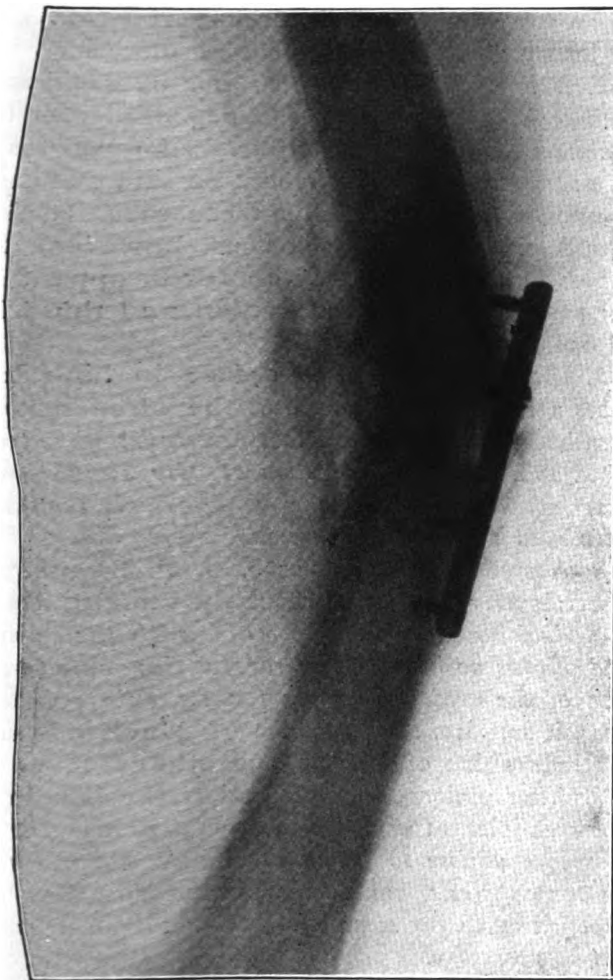


Fig 12. Case II. Seven weeks after Lane plating. Deformity and non-union.

sion. The fracture ends were not freshened, nor were the fragments otherwise manipulated. The bone graft was held in place merely by sewing over it the retracted periosteum and muscles. Plaster cast as before.

The cast was removed after six weeks, when there was solid union.

As a consequence of the prolonged immobilization (25 weeks in Mount Sinai Hospital, and several elsewhere after the original injury), the knee had become stiffened by fibrous ankylosis. To overcome this, on August 19th (9 weeks after the second operation) I performed brisement forcé

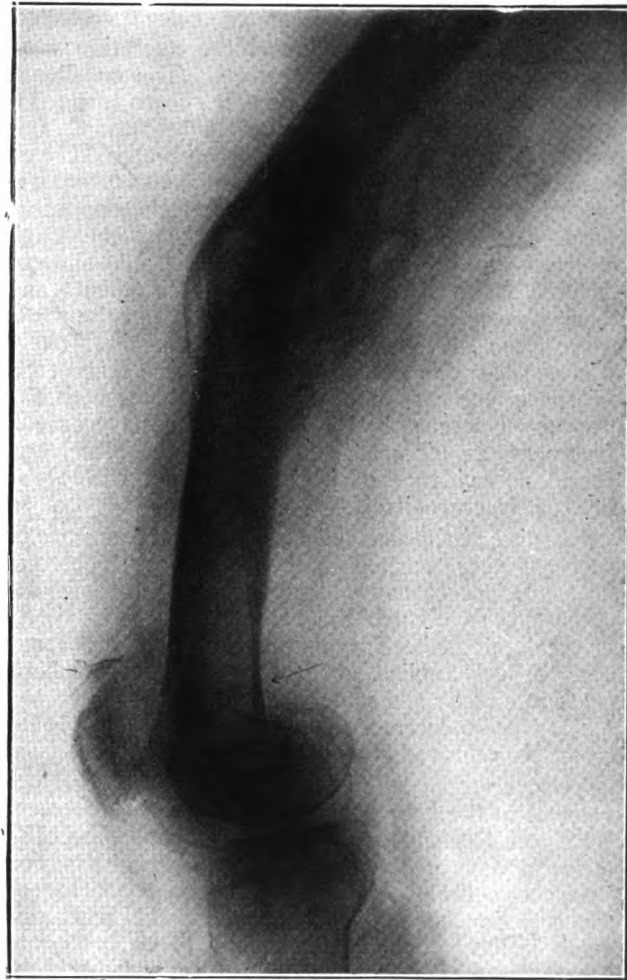


Fig. 13. Case II. Solid union six weeks after removal of plate and application of bone graft. Lateral view, obscuring the graft. Note the fractures (marked by arrows) caused by brisement force.

October 1st, the mobility of the knee very rapidly improved, and within a few months thereafter it increased to  $90^\circ$ .

When I last saw the patient, several months ago, she had a very good range of knee motion, she walked well, the union of the femur and tibial fractures was solid, and there was no deformity. The shortening of the extremity is three-quarters of an inch or less.

To study the fate of the bone graft a series of radiographs (figs. 5, 6, 7, 8) was made at intervals of several weeks after its insertion.



The record of CASE II is in all respects the same as that of CASE I, except that it concerns a *recent* fracture, also transverse, of the middle of the shaft of the right femur in a robust muscular lad of 19 (fig. 10).

Immediately after his injury he was admitted, April 7th, 1912, to Mount Sinai Hospital. With no apparatus then at hand, repeated efforts at reduction by manual traction were made. These failing to overcome the overriding, which was  $2\frac{1}{2}$ " under traction, on April 19th Dr. Lilienthal reduced the fracture by open operation, and attached a  $3\frac{3}{8}$ " Lane plate with four screws. A long spica plaster cast was applied.

No undue reaction followed the operation; and the soft parts healed *per primam*. The excellence of the apposition and alignment is shown in fig. 11, a radiograph made 6 days after the operation. But neither the Lane plate nor the well-applied cast maintained that alignment. When the cast was removed, June 20th, seven weeks after the operation, there was evident forward bowing of the thigh and *non-union*; and a radiograph (fig. 12) showed decided forward angulation of the fragments and tearing away of the upper fragment from the plate.

On June 24th, I exposed the bone again. There was considerable recent callus about the fragments, except in the region of the plate which, with the two upper screws, had loosened from the proximal fragment, as pictured. I removed the plate, and found no evidence of beginning union within the line of fracture itself.

In spite of the decided angulation, the deformity was not very marked in this muscular thigh, and not sufficient to cause disability. I therefore decided not to disturb the callus or the bone itself by realigning the fragments. Leaving them undisturbed, I applied a tibial osteo-periosteal bone graft in exactly the same way as in Case I.

Six weeks later, August 6th, when the plaster cast was removed, there was *solid union*.

To overcome the fibrous ankylosis that had developed in the knee I performed a gentle brisement forcé on September 2d. A radiograph (fig. 13) taken a day or two later disclosed an infraction just above the femoral condyles and a tearing of the superior border of the patella. To treat this fresh lesion which, however, had given no symptoms, the patient was again put to bed for four weeks. When he left the hospital, after walking again for a few weeks, he had a rapidly increasing knee-function. When I saw him last, about a year ago, his range of knee-motion was fairly complete; he walked well and although there was a noticeable, but not ugly, forward bowing of the thigh, there was only scant shortening of the extremity.

These two cases afford, I believe, the following deductions:

1. *A metal plate screwed to a fractured bone can, of itself, cause delayed union and non-union.* In seeking the cause of failure of union in these cases it must be remembered that: both were healthy subjects; in one the fracture was recent, in the other union had previously taken place; in both,

union was prompt after the plate was removed; in both, there was primary union of all the soft tissues; in neither, was any other cause for the non-union found at operation.

The evidence of two cases is not final, but it is fairly convincing, especially in connection with the similar experiences of other surgeons. For myself, I am sufficiently convinced of the correctness of this belief to advise against the use of a metal plate and (or) screws in any open operation in which simple reduction, or reduction and the application of an autoplasmic, fresh bone splint-graft (cortical or intramedullary) will probably be sufficient.

2. *Neither a  $3\frac{3}{8}$ " metal plate nor an additional well-applied plaster cast can be depended upon to maintain the alignment of a fractured femur shaft in a very muscular thigh.* It must be said that Lane is using much larger plates in these cases (the increased size also having objections, however), and avoids the plaster cast—which affords opportunity for passive and active muscle action and thus helps to maintain tissue activity.

3. Union might have taken place in both these cases after the mere removal of the offending foreign bodies. But I believe that it would have been slow, and that *the introduction of the simple bone graft actively stimulated the osteogenesis that had been inhibited in the fragments.*

4. A study of radiographs 5, 6, 7, 8, made at intervals over a period of about six months, shows *a gradual fusion of the bone graft with the femur, and affords no indication of rarefaction or absorption of the graft itself.* As far as this evidence goes, it supports the contention of MacEwen<sup>6</sup> and contradicts that of Murphy<sup>7</sup> and others.

5. After prolonged immobilization the bones (at the knee-joint, at any rate) are very brittle. *It is therefore unwise to perform brisement forcé for fibrous ankylosis, until the extremity has been in function again for some time—after which, it may not be necessary.*

30 WEST 92D STREET.

<sup>6</sup> MacEwen, The Growth of Bone, James Maclehoose & Sons, Glasgow, 1912.

<sup>7</sup> J. B. Murphy, *Journal of the A. M. A.*, April 7, 1912, *et seq.*

In fractures of the anatomical neck of the humerus, examine carefully for injuries to the brachial plexus.

Fracture of the greater tuberosity of the humerus is one of the lesions that may be found in "stiff and painful shoulder." Radiographically it may have to be differentiated from calcareous deposit in the supraspinatus tendon, also a lesion frequently found in shoulder disability.

# THE INLAY BONE GRAFT AS A TREATMENT OF UNUNITED FRACTURES. A REPORT OF FIFTEEN SUCCESSFUL CASES.

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NEW YORK CITY.

This paper is supplemental to the following brief reports appearing in the *Journal of the American Medical Association*, August 3, 1912, page 353; *The Post-Graduate*, November, 1912, Vol. 27, No. 11; and Author's *Stereo-Clinic*, published by The Southworth Co., 1913; and is based upon the results of 15 cases of ununited fractures, and an experience gained from the application of the bone transplant to 205 additional cases of varying character.

I have often said that the Lane plate and other internal metal splints, when applied to ununited fractures of long standing, are a hindrance rather than an advantage in securing bony union. This view has been strengthened by the accumulation of experience.

The indications for treatment in fresh fractures and ununited fractures are entirely different although it is very evident from the discussion of these problems with various men and the large number of failures seen in our clinics, that many practitioners do not appreciate this difference.

In a large percentage of fresh fractures temporary fixation only is necessary to insure union, as the osteogenetic function of the fragments is active and in the presence of accurate apposition union occurs rapidly. The proper application of the Lane plate in suitable cases fulfils all requirements.

In ununited fractures the problem is quite different. We have here in the ends of the fragments a marked diminution or an entire cessation of osteogenetic activity. This cessation of activity is evidenced in the marked sclerosis or eburnation which is always found in ununited fractured ends, often extending back from the seat of fracture, from three-fourths to two inches.

The pathology of this condition of sclerosis is very similar to that found in non-ankylosing osteoarthritis where there is an over-deposit of calcium salts, and a consequent diminution and degeneration of bone-producing cells. The therapeutic requirements of these pseudoarthroses are fixation, and stimulation of osteogenesis on the part of the fragments, and an osteogenetic scaffold connecting the active bone in each fragment back of the eburnated areas.

The bone graft, when inlaid according to the herein described technique, is the only means of

fulfilling these requirements. Two, if not all, of these three essentials are necessary in order to secure union.

The Lane plate furnishes but one of these, viz., temporary fixation, but at the same time it causes absorption and disintegration of bone. The bone transplant not only produces fixation but also stimulates callus-formation and grows bone on its own part.

Abundant evidence has accumulated to prove that something more than fixation is necessary in these conditions. The most favorable cases for external fixation, such as fractures at the middle third of the tibia, with the fibula intact, have failed to unite in spite of months of effectual splinting and recumbency in bed. Operation showed no interposition of soft tissues and there was no evident reason for non-union.

Codivilla appreciated the above-mentioned thera-

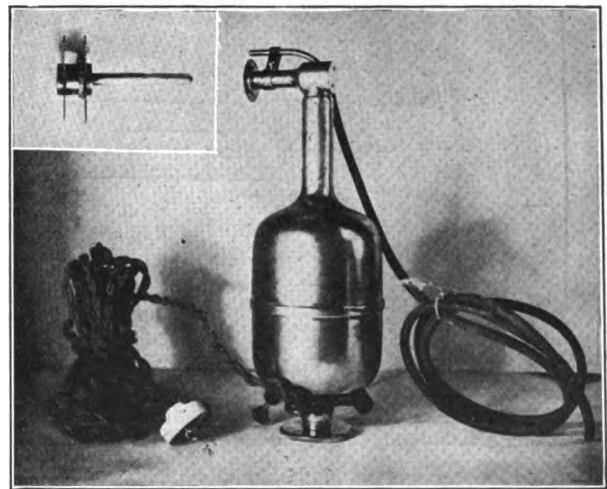


Fig. 1. The Author's modification of the Hartley-Kenyon motor. The right angle arm for saw with gear for reducing speed of saw and the tube, on the left, for constant spray of saline solution on saw from an elevated douche bag are recent and important improvements. The above mentioned twin saw is shown in the left upper corner of the illustration, this can be easily and quickly adjusted into motor in place of single saw already there. For technic of its use see text.

peutic requirements and met them partially by spanning the fractured area with a very thin autogenous periosteal graft, which gave a fair percentage of good results. But it was not an ideal procedure in that it did not furnish efficient fixation, it did not stimulate osteogenesis between the end of the fragments, because it was entirely superficial, and it did not penetrate cortical bone structure. Being extraosseous it therefore furnished an imperfect graft environment.

Murphy has evolved a better method in his use of an intramedullary dowel, which furnishes more effectual fixation and, being entirely intracutaneous, favors stimulation of osteogenesis by better contact of graft to recipient fragments. It is, however,

difficult thus to get contact of graft to active bone beyond the sclerosed area, which is most important. It is also difficult of application in small bones, such as those of the forearm, where the medullary canals are small. As in the case of the intramedullary aluminum splint of Elsberg it is most difficult to secure the necessary lateral fixation in fragments of the ulna and radius, where these bones have been contracted together during long existing non-union.

An illustrative case that will be mentioned later was that of an ununited fracture at the middle of the radius of four years' duration. After four unsuccessful operations, including Lane plating, the radial fragment ends were found closely contracted to the side of the ulna. They were freed with

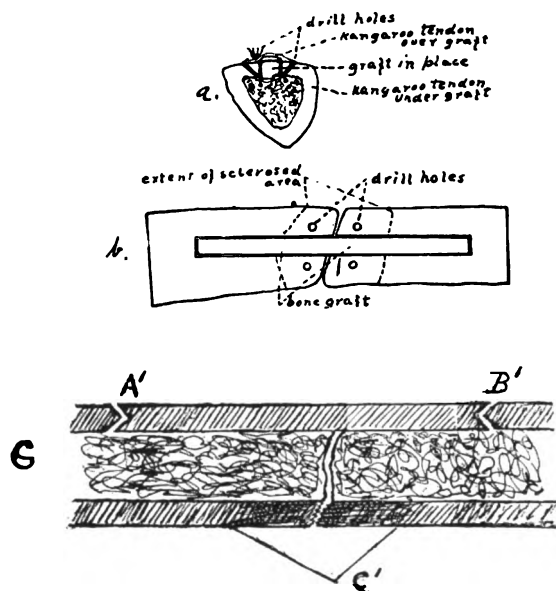


Fig. 2. Diagrams of graft in place in fracture of long bones. a. Is cross section of tibia with graft inlay into cortex and held in place by kangaroo tendon sutures as described in above text. b. Is longitudinal surface view of graft in place showing location of drill holes for kangaroo sutures. c. Longitudinal sagittal section of bone graft in place. This diagram shows graft spanning the fracture area, also how the tongue and groove ends fit together. a.b. indicates graft. c. indicates fracture with sclerosed bone extending distally from joint of fracture.

difficulty and held in proper alignment by a long inlay bone graft. On account of the strong tendency of the angulation to relapse the necessary lateral fixation would have been impossible by any intramedullary splint. The problem was easily solved by the leverage action of a long inlay bone graft. It is always difficult to get a tight fit of the intramedullary splint into both fragments. In my experience with the Elsberg intramedullary splint, it was found after operation that in certain cases the splint worked out of one fragment into the other and thus failed to furnish the desired immobilization. This is not so likely to occur in the case of the Murphy intramedullary graft on account of the formation of expected early adhesions.

The technique applied in twelve of my cases, namely, fractures of the tibia, shaft of the femur, radius and humerus, was as follows:

The fractured area was exposed by a generous skin incision. When the fractured bone is superficial, as in the case of the tibia, the incision is made lateral to the intended site of the bone insert. The skin and subcutaneous tissues retracted, the bone ends are developed and freshened with chisel, motor burr or saw, and the sclerosed bone plug is removed from the medullary canal.

If there is overlapping of the fragments the amount of pull required to correct it varies with the degree of overriding at the site of fracture. In the case of a fractured femur in a muscular man, as



Fig. 3. Case I. Showing conditions after Lane plating. Sagittal view.

much as a 150-pounds pull may be necessary to secure sufficient extension. In this instance, it is far better to set up and adjust a traction pulley apparatus with heavy weights. This provides a constant and uninterrupted pull. If the fragments still overlap and sufficient extension cannot be made to bring them together, it is necessary to trim off the fragments with motor burr, saw or chisel until good position can be secured. This will produce shortening, but it can not be avoided.

The fragments are now held in good alignment by an assistant. The periosteum is divided with a knife longitudinally over the bone to be removed in making the gutter for the bone insert. The periosteal flaps are turned back to either side exposing the bone.

Two parallel saw cuts, about  $\frac{3}{8}$  of an inch apart, are made longitudinally of the fragment ends com-

pletely through the bone cortex to the marrow cavity with a motor twin circular saw (see, fig. 1). The distance between the saw cuts is arranged by adjusting the distance between the twin saws. These cuts are made from  $2\frac{1}{2}$ " to 3" into the end of each fragment from the line of fracture, while the fragments are held in good alignment. They should always extend far enough from the line of fracture to reach well into the non-sclerosed, active bone of either fragment. This distance is subject to considerable variation, depending upon the site of fracture and the amount of eburnation present. The distance the twin saws should be apart, i.e., the width of the gutter for the graft, should be from  $5/16$ " to  $8/16$ " according to the size of the bone. The revolving saws are kept constantly bathed in

greater the muscular contracture, the more securely is it held in place.

The exact length of the desired insert is obtained by measuring the gutter and transferring this measurement to the exposed antero-internal surface of the opposite tibia. A flexible probe is usually satisfactory for this purpose, a right-angled bend marking the exact measurement.

The wound and gutter are packed with hot saline compresses while the graft is being prepared. The patient remaining in the dorsal position, the graft-yielding tibia is exposed by an incision over its crest. The overlying structures are retracted, and the size and shape of the graft is outlined in the periosteum by means of the scalpel with the probe measure as a guide. With the twin saws adjusted



Fig. 4. Case I. After Lane plating. Lateral view.

saline solution by a spray connected with a sterile tube to a fountain syringe. This prevents the development of excessive heat from friction, which should be always avoided on account of its devitalizing effect upon peripheral bone cells.

After the twin saws have travelled the desired length to make the gutter for the graft, the bone fragments between the saw cuts are removed by severing the ends distal from the point of fracture with a narrow osteotome in such a manner as to effect a tongue-and-groove joint with the ends of the graft (see illustration). With motor-driven drill, holes are bored in the cortex on either side of the gutter slanting inward to the marrow cavity. These holes are placed near the line of fracture so as to fix the center of the insert. The ends of graft are secured in position by the above-mentioned tongue-and-groove joint, when feasible, or by additional sutures. This joint is very quickly shaped and the

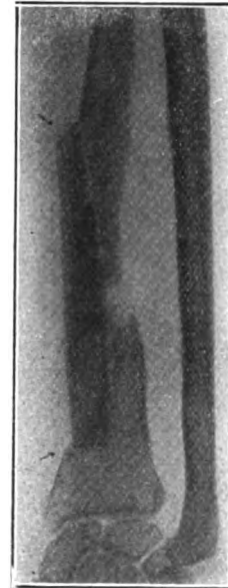


Fig. 5. Case I. Showing bone graft in position and fragments aligned.

to the same distance apart as when forming the gutter, bone cuts are made to the marrow cavity along the antero-internal tibial aspect. With a narrow osteotome or small motor-driven saw or burr the graft is now dislodged and the ends grooved with the motor saw to fit the triangular tongue of the gutter ends.

A double strand of heavy kangaroo tendon is passed through the drill holes previously made. One strand in each fragment is now pulled up from the bottom of the gutter and the graft is placed under them. Traction is now exerted on limb and the graft is forced into position.

A good fit is assured because the same adjustment of twin saws is maintained both in forming the gutter and in removing the graft, and they must be of equal and uniform width throughout their whole extent. Traction is now removed and the

elasticity of the soft parts forces the tongue-and-grooved ends into tighter adjustment. The kangaroo fixing sutures are then drawn taught and tied over the graft.

It is readily seen that this not only affords most effectual fixation but also furnishes a most ideal environment for the bone graft. It brings each structural layer of the bone graft into close apposition with its corresponding layer in the recipient fragment, namely, periosteum to periosteum, cortical bone to cortical bone, endosteum to endosteum, and marrow substance to marrow substance. Periosteum, and when possible endosteum and marrow substance, are always included in the graft. We have proved by animal experimentation that this close contact of Haversian systems assures per-



Fig. 6. Four months after operation. Ununited fracture of tibia and fibula of one and one-half years' duration. Middle aged woman of 250 pounds. Fracture of extreme lower end of tibia within  $\frac{1}{4}$  inch from tip of internal malleolus with marked displacement backward of foot. A. indicates old point of fracture. Replacement difficult. An inlay graft about three inches long spanning the fracture was placed reaching to the tip of the internal malleolus and held in position. The mechanical action of the inlay graft placed into the inner aspect of the tibia held the reduced fragments perfectly, although there was a strong tendency to the recurrence of the old displacement. The fact of the loss of definite outline of the graft is due to the thorough fusing of it with the tibia.

manent viability at least of a large portion of the insert. The bone which has been removed from the ends of the graft in order to form the above-mentioned grooves and other normal bone fragments are finely chipped with a rongeur and pushed between and placed about the ends of the fragments at the line of fracture wherever possible. These act most effectively as supplementary foci of osteogenesis. MacEwen has well pointed out that the efficacy of a bone graft varies in inverse ratio to its volume. The smaller the graft the greater the relative osteogenesis.

The site of the fracture is covered with the peri-

osteal flaps which were reflected to expose the bone to be removed. This gives two layers of periosteum covering the transplanted fragment. The overlying tissues and skin are closed without drainage. The leg wound is closed in a similar way except that the adjacent muscles are drawn into the cavity from which the graft was taken. Splints are applied and not removed before five weeks.

#### ILLUSTRATIVE CASES.

CASE I, M.S.—Female, 45 years old, always healthy. Four years previously she fell, fracturing the right radius at the junction of the middle and distal thirds, the ulna remaining intact. Fragments reduced under ether. No union occurring in eight weeks, fracture was cut down upon and muscle freed from the bone ends. Good apposition was

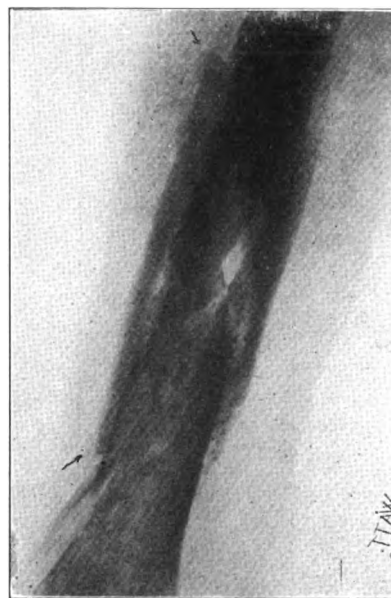


Fig. 7. Comminuted fracture of lower end of femur. No union or callus formation after 69 days of fixation treatment in bed. Bone graft inserted, resulting in firm union in five weeks. There was loss of bone substance for about two inches and the graft was placed so as to span this distance, thus preserving nearly the full length of the leg. Upper arrow points to end of graft and to proliferating bone originating both from graft and the recipient fragment, on account of the necessity of the graft being so large in diameter it was not inlaid level with the periosteum.

secured but no union followed. A second open operation was performed and the fragments nailed together. Again no union resulted. At a third open operation the fragments were wired, but again no union followed. Two years after the fracture, at a fourth operation, Lane plates were applied, and this also was followed by non-union. Two years later, four years after the fracture, the patient in desperation consulted me to determine whether something further could not be done, for her arm was both painful and useless.

November 7, 1913, the fracture was cut down upon and the Lane plate was found loose in the peri-osseous tissues. The tips of the screws were found in large circular cavities in the bone from which they had loosened. There was a depression in the side of the fragment ends where the metal

plate had caused an absorption of bone. The radial fragments, as shown in figures 3 and 4, were much shortened from the previous operations and the metal contact, and badly angulated towards the ulna. Their ends were made fresh and with much difficulty their alignment was corrected. This caused the fragments to retract from each other about an inch. The periosteum on the outer side of each fragment was incised distally from the fracture for two and one-half inches and retracted, exposing the bone.

By means of the motor saw and osteotome a gutter was made in the fragments according to the above-described technique, about 3/16 of an inch wide, and three and one-half inches long.

With the motor saw a graft  $3\frac{1}{2} \times 7/16 \times 3/16$  inches was removed from the anterior internal aspect of the tibia and trimmed with the saw so that it fitted tightly into the gutters in each fragment.

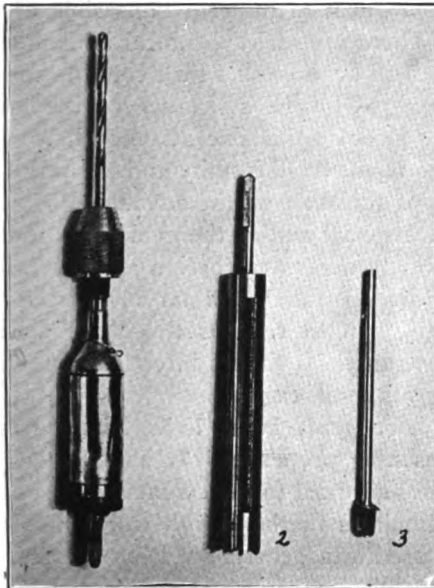


Fig. 8. 1. Is chuck holding small drill. 2. Is Author's dowelling instrument for turning out a perfectly round dowel for ununited fractures of the neck of the femur. This instrument is placed into the motor in place of the saw and while revolving very rapidly a graft (taken from the crest of the tibia by means of the motor saw) is pushed into it, thus being made perfectly round. The cutter at the lower end of the instrument can be changed for a smaller one for turning out pegs or nail grafts which are used in place of metal ones. 3. Is the Author's large motor burr drill for drilling the neck of the femur for the dowel graft. The dowel made by dowelling instrument No. 2 fits tightly into the hole made by this drill.

The strong tendency of the angular deformity to relapse was prevented, and the fragments were held very securely by the heavy kangaroo bone suture previously described. A plaster of Paris cast was applied and upon its removal, five weeks later, firm union of the fragments had occurred in good position (see fig. 6).

CASE II, H. C.—Male, 28 years old, in an automobile accident in Scotland April 5, 1911, sustained a fracture at the middle-third of the right tibia and fibula. The fracture was reduced and placed in a plaster of Paris splint. Seven weeks later no union had occurred and Bier's hyperemia was applied for four months at a hospital in Scotland. No union resulted. One year after the fracture, with non-union, I cut down on the tibia and inlaid a graft

five inches long according to the above-described technique. It was not deemed necessary to disturb the fibula. In five weeks firm union had occurred. Excellent function existed twenty months after the operation.

In cases of non-union and certain fresh fractures of the vertebrae when displacement and cord pressure have not occurred, the bone graft as applied by me in Pott's disease is applicable for support and fixation (*Journal A. M. A.*, April 5, 1913; *New York Medical Journal*, March 9, 1912; *The Post-Graduate*, November, 1912.)

An illustrative case is that of a young woman referred by Dr. E. H. Johnson of Naugatuck, Conn. She sustained, in a railroad accident, a horizontal fracture through the middle of the body of the eleventh dorsal vertebra. Plaster of Paris jackets were worn continuously for one year, at the end of

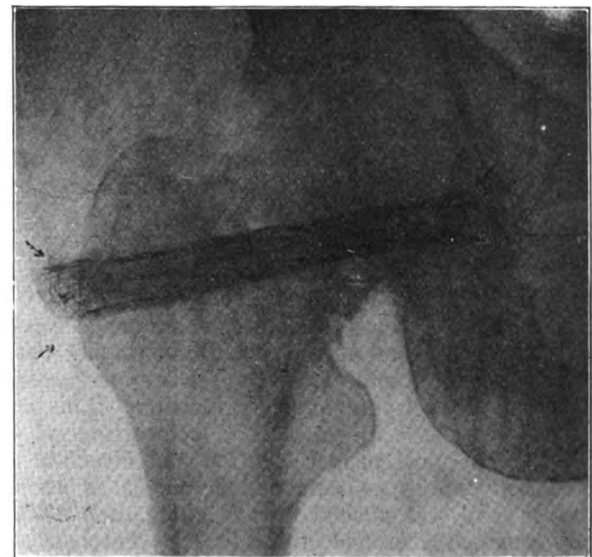


Fig. 9. For further description of this case see text of the above mentioned ununited fracture of neck of femur in woman 60. Arrow points to dowel graft from other tibia. (See fig.) Author's dowelling instrument. Firm union resulted. Lower arrow points to large amount of new bone proliferating from end of graft and extending into soft tissues.

which time support was so necessary that whenever the casts became soft the patient complained of pain and lack of support and asked for a fresh jacket. The tips of the 10th, 11th and 12th spinous processes were exposed through a circular incision to the right, turning up the flap of skin and subcutaneous tissues. These spinous processes were split *en masse* with the attached supra- and interspinous ligaments, with a scalpel, thin chisel and mallet. A graft of sufficient length was removed from the crest of the right tibia and inserted in the cleft. The split ligaments, with the imbedded fragments of the spinous processes, were drawn over it by means of interrupted sutures of medium sized kangaroo tendon. The patient was kept on a fracture bed for five weeks. The support from the graft thus imbedded gave immediate relief although no plaster of Paris jacket was applied. At this writing, one year later, there is no evidence of pain or lack of support.

In cases of ununited fracture of the neck of the femur the bone graft is even more necessary than in the shafts of long bones, for here the mechanics, blood supply, and osteogenetic conditions are much more unfavorable to union.

This is exemplified by the case of a young woman who received a fracture of the neck of the femur and four months later non-union was evident. The pseudo-arthritis was cut down upon, the ends of the fragments were freshened and the fragments were held together by a long square tin-plated spike driven through the great trochanter and neck into the head. A long plaster of Paris spica was worn for ten weeks. Primary union of the soft tissues resulted. Much bone absorption about the spike occurred, and non-union resulted.

The above experience, among others, has induced me to evolve the following technique for the use of the bone graft in place of the metal spike:

**Illustrative case.** Female, 60 years old. Non-union of the neck of the femur of five months duration. The point of fracture was reached through an anterior incision from the anterior spine of the ilium downward for five inches. The ends of the fragments were freshened by chisel and sharp curette. A point just below the great trochanter was reached by a short lateral incision.

The proper location through the center of the neck and the direction of drill hole for the graft were determined by thrusting a small hand drill through the great trochanter obliquely upward through the center of the neck and into the center of the fractured end of the capital fragment, as felt or seen through the anterior incision. This may necessitate the withdrawal and reinsertion of the drill. When the proper location and direction for the drill hole was determined the large motor-driven drill was pushed inward along the direction previously determined, through the center of the neck and well into the head. This drill, made after my directions, produced a hole 6/16" in diameter. The drill was then disengaged from the motor and left in to hold the fragments in apposition while the bone graft was being removed from the crest of the opposite tibia.

This graft was removed by the motor saw and was about four inches long by 6/16 to 7/16 inches in cross-section. My dowelling instrument, which turns out a dowel of proper size to fit the drill hole, was then adjusted into the motor (see fig. 6).

While the motor was held by an assistant, I fed the graft slowly into the dowelling instrument. This was done with comparative speed and assured a perfect fit. This strong graft was driven into place by a metal mallet. The operative technique was precisely the same as when the metal spike is used. The skin was closed without drainage. In six weeks there was firm union. Six months after operation the patient walked about without pain and with perfect function.

#### SUMMARY.

The bone graft as applied in the fifteen cases of pseudo-arthritis herein mentioned, has given 100% of bony unions.

On account of the eburnation which always exists in the ends of fragments in cases of pseudo-arthritis, it is essential to use healthy bone from elsewhere in the body, as the tibia.

In cases of fresh fracture, however, the bone being normal, material can be taken from the fragments themselves and used to advantage. This is best done by making the saw cuts in one fragment just double the length of the other and transposing the two strips of bone removed.

This as well as other similar technique would be impossible without resorting to the motor saw. The proper use of the motor saw, by shortening the time of operation, lessening the traumatism, and affording a means for accurately shaping the bone grafts and their beds, has opened up a very wide field of application hitherto impossible of development. There are many technical difficulties in connection with bone work which could never be overcome except for the assistance of the motor saw and its various adjustable attachments.

In the repair of deformity and the result of traumatism of the skeleton the advantage of the use of its own material and of the avoidance of the former seemingly necessary foreign substances has been clearly demonstrated. Metal introduced into the tissues is in most respects the direct antithesis of the bone graft. It favors infection, absorption and disintegration of tissue.

The bone graft being living tissue has certain germ-resisting properties. It immediately becomes adherent and fixed to the contacting tissues. It not only stimulates the bone with which it is contacted to increased osteogenesis but it proliferates bone on its own initiative.

40 EAST 41ST STREET.

#### OPEN OPERATIONS IN FRACTURES.

Theoretically, open operations on fractures aseptically conducted should be of benefit in every way, first, by giving us a complete insight into the nature and extent of the injury; second, by enabling us to bring about more perfect adjustment; and third, by relieving much of the edema and blood stasis which is often so troublesome. Practically, we must bear in mind that infection does and will probably continue to occur in a certain, though perhaps small, percentage of cases, and where infection does occur, the last state of that man is apt to be worse than the first.—C. E. CALDWELL in *The Lancet-Clinic*.

In the aged, pain and disability in the arm after traumatism demand especial care in examination of the shoulder. Fracture of the head or greater tuberosity of the humerus is often overlooked.



## ON THE DIAGNOSIS OF FRACTURE.

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It sounds like the rankest platitude to say that the physician should be able to recognize a fracture, and, having recognized it, should be able properly to treat it. And yet a large proportion—probably a majority—of suits for malpractice are based upon failure to recognize a fracture or upon its improper treatment; and a large portion of the cases of fracture brought to the consulting surgeon are those in which the injury was unrecognized at first or was improperly treated. And these failures, it must be remembered, are not merely failures to recognize details; they are failures to recognize the main injury.

It is worth our while, then, to inquire why these failures occur, why they are made by men who are careful and well-informed, and to learn if possible how to avoid them.

The difficulty seldom arises in fractures of the shaft of the long bones at a certain distance from the ends; and when it does so arise the probability of harm ensuing to the patient is slight, for there is little or no displacement of the fragments, and the pain or sense of powerlessness in the limb is usually sufficient to insure its adequate protection and withdrawal from use for a period sufficient for repair. Such a case might be, for example, a subperiosteal fracture of the clavicle in a child or a fracture of the tibia by a twist of the limb.

The forms of fracture in which the nature of the injury is most frequently overlooked are those in which the break involves the end of the bone or lies close to it.

The reasons of this failure to recognize are not far to seek. The commonest one, in my experience, arises through an unconscious or subconscious expansion of the rule given for the recognition of a fracture. That rule is that if abnormal mobility and crepitus can be detected a fracture is present. The examiner, seeking those signs and not finding them, is led to infer that their absence is proof of the non-existence of a fracture. This inference is so frequently made and is so frequently erroneous that I have sometimes been tempted to wish that these two signs of fracture might be banished from our text-books and our teaching. While I have applied this criticism to both signs, it is more specially applicable to crepitus. Almost always the physician

or the student in giving his reasons for thinking no fracture was present will say "I could not find crepitus." Much less often will he speak of abnormal mobility.

Crepitus is the click felt or heard when one fragment is moved upon another. If the fragments are not in contact or if they are not moved upon each other crepitus, of course, is not obtained. The conditions are frequent in which they are not in suitable contact or in which they cannot be moved by manipulation restricted within justifiable limits. Take, for example, a fracture of the neck of the femur, which is frequently and disastrously overlooked and in which, by the way, a vigorous search for crepitus may do irreparable harm. The small upper fragment is frequently so fixed to the lower one by impaction or interlocking or by untorn periosteum and other soft parts that movements communicated to the limb (the lower fragment) will far more easily find their center of motion in the joint than at the point of fracture. That is, the small upper fragment moves so easily upon the acetabulum that it accompanies the lower fragment in all communicated movements and no movement takes place between the two fragments, and consequently no crepitus is produced. It is not until the communicated movement has been pushed beyond the point at which the movement of the head within the joint is checked by normal anatomical, or perhaps abnormal, conditions that the manipulation forces the lower fragment to find a new center of motion at the point of fracture and thus produces crepitus. In pushing the exploration to this improper extent a favorable relation of the two fragments to each other may be changed for the worse or the periosteum of the neck, through which alone the vitality of the upper fragment can be conserved, may be further torn and repair be made impossible.

Fortunately there are other symptoms by which, without the aid of crepitus and abnormal mobility, the presence of a fracture may be recognized or its absence may be confidently assumed. Of these the principal one is pain, pain caused by certain manipulations of the surgeon or by the attempt of the patient to exercise the functions of the broken bone. The surgeon's manipulations are the making of pressure with the end of the finger over the site of the fracture, and the pressing of the fragments together, usually by pressure made in the long axis of the bone. In the first, the surgeon supports the limb broadly and firmly so as to avoid chance movements which might cause misleading pain,

and then with the tip of the finger or, when the bone is subcutaneous, with a smaller object such as the rubber on the end of a lead pencil, he makes pressure at various points over the bone. If a fracture is present such pressure along its line will cause pain strictly limited to the points pressed upon and their immediate neighborhood.

Thus, in a typical Colles fracture, pain will be found on the outer side and the outer portion of the dorsum of the radius; in a Pott's fracture, on the lower outer portion of the fibula, over the front of the lower tibio-fibular joint, and at the internal malleolus or just below it; and in a fracture of the external malleolus by inversion of the foot, at a point about three-fourths of an inch above its tip. In such cases abnormal mobility and crepitus are not needed for the diagnosis, and in most of them they cannot be obtained except by the use of undue force.

If a fracture runs across a bone, destroying its continuity, pressure of its two ends toward each other causes pain by pressing the broken surfaces together. Thus, in fracture of a metacarpal or metatarsal bone pressing the corresponding finger or toe upward causes pain at the point of fracture; in fracture of the surgical neck of the humerus pressure upward against the elbow causes pain near the shoulder; in Colles fracture pressure upward, or upward and a little outward, on the hand causes pain, and so, in like manner, does grasping an object firmly with the hand of the injured limb so as strongly to contract the flexors. In a Pott's fracture or a fracture of the external malleolus twisting the foot in the direction in which it was twisted to cause the fracture will be painful, and in a fracture of either condyle of the femur or of the external condyle of the humerus pressing the lower segment of the limb toward the injured side (and sometimes in the opposite direction) will cause pain. In all these manipulations it is essential that the effort be intelligently directed to effect the desired pressure and to avoid other stresses and pressures which might by chance act upon other injuries elsewhere and thus mislead.

In adults these measures are prompt, effectual, and safe. In children, especially the very young, they may be much hampered or defeated by the timidity of the patient.

The other method of causing diagnostic pain is to put the broken bone in normal physiological action as a lever to overcome some resistance. Thus, in fracture of the ulna an attempt to extend the elbow against resistance causes pain at the seat of fracture; coughing, as all know, causes

local pain when a rib is broken; biting, when the jaw is broken. All these tests are easily made when the patient is old enough and collected enough to make the required effort.

When one of these tests is affirmative, if it causes pain at the same spot each time, and if no other explanation of the pain can be given, it is almost invariably safe to make the diagnosis of fracture. But when the test is negative the inference that a fracture is absent must be drawn with some reserve. Some patients are exceptionally, remarkably, insensitive, and sometimes mechanical factors are present which prevent the contact or the movement of the fragment or the strain on the partly torn tissues which is needed to cause pain. And it especially needs to be noted that not infrequently in fracture of the neck of the femur firm pressure of the limb upward against the trunk does not cause pain. And we all know that such patients can sometimes walk; with some limping, it is true, but yet they can get about more or less well, sometimes for several days.

This fact, of course, is likely to mislead and is in itself largely responsible for some of the many failures to recognize a fracture at the hip. And these failures are so frequent that it may be well to point out in some detail the means by which the error can be avoided. In elderly persons the matter is simplified by the warning uttered a century ago, and often repeated, that in any case of obscure injury to an old man or woman which has caused even partial disability of the limb it should be treated as a fracture of the neck of the femur. We now know that these fractures are far more frequent in the young than was formerly supposed and that it is especially in the young that the ability to use the limb may be maintained. In such cases, in the absence of the *x*-rays, we must depend for the diagnosis upon pain and swelling. Shortening is absent, or if present and slight, cannot be depended upon because of the difficulty of exact measurement and the possible existence of a normal inequality. Independent mobility and crepitus do not exist. But there is pain on pressure behind the neck and sometimes on similar pressure in front or on pressure inward against the outer surface of the great trochanter. And, above all, there is fullness and resistance in front in the upper outer part of Scarpa's space, readily recognized on comparison with the opposite side. It is due in fracture at the base of the neck to the reaction in the overlying soft parts adjoining the seat of fracture, and in those of the narrow part of

the neck presumably to distension of the capsule. In the presence of these signs it is not only prudent but also, I think, a plain duty to make the diagnosis of fracture and rigorously to treat the case as such.

## VICIOUS UNION, IN THE NEIGHBORHOOD OF JOINTS.

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It is a fact well known to orthopedic surgeons, that cases of vicious union in the neighborhood of joints form a conspicuous part of their labors in this special field of surgery. Unfortunately these cases are referred to us, not immediately or at an early stage, but more usually after a period of six weeks or more has elapsed after the union has occurred in a vicious position, often associated with deformity and a marked degree of shortening. The conditions found may be so divergent, that each case resolves itself into a special study. Indeed, so true is this statement, that the orthopedic surgeon needs to tax his resources in working out these problems before interfering, as well as to use considerable ingenuity at the time of operation. The deformities often brought to the attention of the orthopedic surgeon, relating to vicious union include:

- 1.—Sprain-Fracture. (Rupture of the ligaments.)
- 2.—Separation of the epiphysis.
- 3.—Fracture in the vicinity of, or within the joint.
- 4.—Fracture complicated with dislocation.
- 5.—Vicious union in the vicinity of the joint.
- 6.—Ununited fracture in the vicinity of the joint.

1. *Sprain-Fracture.* This form of fracture, often seen about the articulation of the ankle or wrist, but which may occur at other joints, frequently occurs in football players and in victims of falls, as upon the ice, etc., in which there is an avulsion of a ligament from its bony insertion. Callender, who first observed it, described it as "a separation of a tendon from its point of insertion with detachment of a thin shell of bone."

2. *Separation of the Epiphysis.* This variety of fracture is found in those whose bodily growth is incomplete, the fracture occurring wholly or principally at the cartilaginous junction between the epiphysis and the shaft of the bone. In this frac-

ture the periosteum is usually stripped off for some distance from the shaft, remaining attached to the epiphysis. It is not infrequently found in the newborn due to traction upon the arm or in the axilla during delivery. Later in life, one of the forms of fracture of the humerus is separation of the epiphysis, the fragment usually comprising the entire epiphysis in several distinct and recognizable pieces.

3. *Fracture in the Vicinity of and Within the Joint.* These fractures are classified in regard to their topography to neighboring joints, thus, "intra-articular" indicates that the line of fracture extends *into* a joint, important because of the possible articular inflammation and of the possible change in the relations of the fragments, either of which may permanently restrict mobility in the joint. When extravasation reaches such an articular structure intra-articular effusion results as a result of irritation of the outer surface of the synovial capsule.

4. *Fracture Complicated With Dislocation.* In many instances of dislocation, because the associated structures are put on the stretch, the tearing of some ligaments, and the possible rupture of attached muscles, it is not infrequent to find fractures occurring as complications. Thus the shaft of the dislocated bone or of a parallel bone may be broken under such a force and strain. Fracture of the shaft or of the neck of the dislocated bone may prove a serious obstacle to reduction, because of lack of the leverage required for the surgeon in performing the necessary manipulations. As one of several illustrations, we may cite the fact that fracture is not an infrequent complication of dislocation of the shoulder. Such a fracture may involve the prominences of the humerus or scapula or the anatomical or surgical neck of the humerus. In anterior dislocation the upper part of the greater tuberosity is frequently broken off through traction of its attached muscles. The periosteal detachment may persist and the displacement be slight or, as in many reported cases, find lodgment in the glenoid fossa, thus offering a serious obstacle to reduction.

5. *Vicious Union in the Vicinity of a Joint.* This complication, also called deformed union, may result from imperfect reduction, from yielding of callus after removal of splints, or secondary displacement due to improper dressing and fixation apparatus allowing motion at the seat of the fracture. It may not, however, be due to any fault of the surgeon, as where great swelling precludes recognition of the displaced fragments, or where the bones are so crushed and comminuted that it is impossible to restore their shape.

6. *Ununited Fracture in the Vicinity of Joints.* Depending upon the period, when abnormal mobility has *not* ceased to exist, such a fracture is at first said to exist in a state of delayed union. Some weeks later the term pseudarthrosis, failure of union or ununited fracture, is applied. The causes may be *local*, as interposition of soft tissue, muscle, etc., between the fragments; *constitutional*, as in debilitating diseases, Bright's disease, syphilis, etc. The fragments of bone in ununited fracture, may not be held together by any material or the union may be ligamentous or merely fibrous. When the ends of the bones, approximate, move upon each other and are supported by a fibrous capsule, a false joint or pseudarthrosis is said to exist.

Before mention is made of any special operative methods, I would like to narrate of the many, two interesting cases, whose descriptions need no further comment.

Mrs. J. F., age 40, fell on the steps of a church and injured her elbow and could not raise the arm to the head. She was examined by physicians in her native town and seven months later was referred to a Philadelphia surgeon. Shortly after she was directed to me and offered the following symptoms, as taken from my case-book: Examination of right arm—Cannot raise the arm to the head, and there is an old thickening in the upper third of the right clavicle. There appears to be a displaced fragment in the inner condyle of the humerus (in the elbow joint). When the arm is extended it can be flexed only 30 degrees. There appears to be a forward dislocation of the humerus, as the triceps tendon is prominent. There has been, and still is pain over the ulnar nerve. When the arm is extended and hanging at the side the fingers are flexed. On the night of the accident, the woman's physicians set and dressed the affected part in a straight wooden splint and two weeks later, under ether, pulled and set at an angle, with a metal splint on the posterior surface. I saw that this was a fracture-dislocation of the elbow which was further corroborated by the *x*-rays. Accordingly, on February 10, 1912, just two weeks after she came to Philadelphia, I put her under ether and prepared for a partial excision of the lower end of the humerus. Under the anesthetic the arm could readily be flexed to 90 degrees with the ulna backward. I opened the joint to an extent of five inches by a posterior incision, freed the triceps tendon and lengthened it one inch, after which the joint appeared to be reduced. The ulnar nerve was exposed and was found larger and darker than normal. After the operation, the patient was enabled to flex the arm and put the hand to the mouth, and thenceforth steadily improved. She wore a brace for a time, and eventually completely recovered.

Another interesting case was that of a boy; L. B., age 12, sent from a neighboring Pennsylvania county, suffering from vicious union of the upper fifth

of the right femur, following a fracture. Examination showed the limb  $2\frac{1}{2}$  inches shorter than the other with a thickened mass in the upper portion of Scarpa's triangle. The Roentgen ray examination showed an overlapping fragment, the fracture being just below the lesser trochanter. The operation was performed at the Philadelphia Polyclinic Hospital. I made an incision five inches long from the anterior superior spine of the ilium. The upper fragment was found drawn upward and inward through the action of the psoas muscle and firm union had occurred. This I separated with the chisel and freshened the ends of the bones. By using strong traction with the limb in the flexed position, the ends of the bones were brought in apposition. I had intended plating the ends of the bones, but I forsook the plan, as the patient was greatly shocked by the operation and manipulation. I then decided to close the wound and dress the limb on a double inclined plane, applying a weight of twenty pounds to the femur. As a result of this treatment shortening did not exceed  $\frac{3}{4}$  of an inch and joint-motion is perfect.

#### TREATMENT.

As has been previously stated, no set rules or positive directions can be arbitrarily set down in the treatment of the deformities incurred by vicious union in the vicinity of joints. Skill and ingenuity alone can successfully treat a class of cases, such as this, presenting varying and various types and degrees of deformity. I shall therefore content myself with the mention of a few salient points most relevant to the subject, remembering that this is no place to describe such measures as are ordinarily treated in the field of general surgery.

(a) *As to Separation of the Epiphysis.* Suspected fractures of this type should receive careful and prompt attention, as they are frequently overlooked—especially in the young. This is especially true in coxa vara traumatica (epiphyseal separation of the upper end of the femur), where often the absence of definite symptoms allows of the development of pronounced deformity. When the accident occurs during attempts to correct ankylosis, rachitic deformities, etc., the employment of a plaster cast in the best possible position in abduction is advised. (After Whitman's method.)

*As to Complicated Fractures.* So-called irreducible dislocations are often associated with fracture in their vicinity. In all such instances the previous history of the individual as regards injury should be considered, and a careful comparison of the injured part with its normal fellow should never be neglected. The reduction is frequently complicated by the associated fracture and displacement of the fragments of the joint, laceration of the soft parts and inflammatory deposits. An excessive amount of callus about the joint may complicate

reduction. The operative measures include traction, manipulation, extension, counter-extension, arthrotomy and resection. Extension and counter-extension are not at the present time employed, since by traction and manipulation all that is possible can be accomplished except in those cases requiring operative interference. When the manipulations have proved unsuccessful, arthrotomy, or opening of the joint, should be undertaken. With strict antisepsis, divide the artificial fibrous bands and remove the callus; the articular surfaces are to be made more normal in outline and foreign growths which may have formed around the surface must be removed. Arthrotomy is frequently required in the shoulder, elbow and hip. Where a portion of the head of the bone is lying loose in the cavity, unless treated at the time of the fracture, it should be removed at the time of operation. The operation devised by Murphy of interposing fascias between the extremities of joints, has demonstrated its value after the reduction of the luxation, where there is a tendency to ankylosis. When attempting the reduction of a dislocation, if a fracture occurs especially near the joint, as at the hip or shoulder, a better position may be secured or the deformity resulting may be subsequently corrected by osteotomy or osteoclasy.

*As to Ununited Fractures.* As a result of faulty setting, muscular action, or secondary displacement, vicious union often occurs, there being evidenced overriding of the fragments, angular deformity or rotation of the fragments upon their long axis. The lower extremity is most often affected in the ratio of 5 to 1. These fractures, in the vicinity of joints, are most productive of deformity either from the fragment projecting directly into the joint or from exuberant callus formation. Treatment depends upon the character of deformity and the period elapsing since the time of the accident. If the callus is found soft, the surgeon should refracture the bone at the seat of the callus deposit and apply a plaster-of-Paris dressing. If two months have elapsed, the angular deformity may be remedied by osteotomy or osteoclasis. Osteoclasis is the best procedure for the shaft of the bone, and osteotomy when the deformity is near the joint. If the fragments overlap and the fracture is compound it may be necessary to remove a portion of bone, and in some situations, as in the fibula or ulna, a subperiosteal exsection may be found necessary especially if the lower fragment be greatly displaced into the articulation.

In pseudarthrosis resection of the ends of the bones may be demanded with wiring or plating of the fragments in normal position. If the pseud-

arthrosis be of recent origin a leg brace will often enable the patient to walk, and the friction of the ends may be followed by firm union. Cuneiform osteotomy is at times demanded in the treatment of angular deformity. In conclusion, it is well to remember that orthopedic affections near or at the joints are very prone in not a few instances to favor the production of ankylosis, a discussion of which subject it is not necessary here to detail.

#### A SPLINT FOR MAINTAINING NAIL EXTENSION DURING TRANSPORT.

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After nail extension is once established in a fracture of the lower extremity, it is of considerable importance to control the effect of traction not only by the fingers and the tape measure, but also by the *x*-ray. The ideal method is to bring the *x*-ray apparatus to the bed-side and to take exposures without disturbing the fractured limb. Very few hospitals have this convenience. Another way is to move the patient, bed and all, to the *x*-ray room by

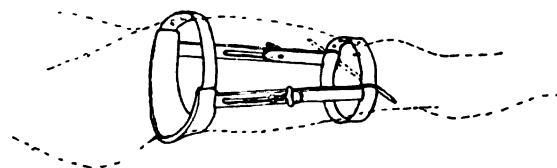


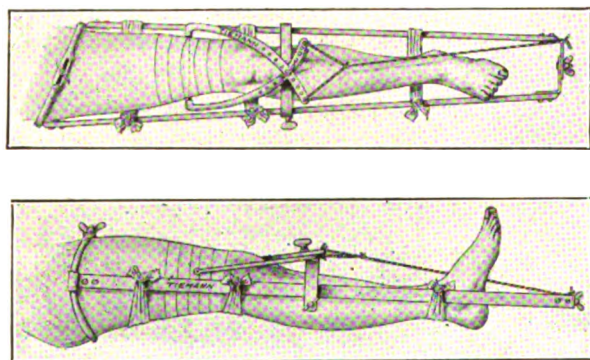
Fig. 1. Steinmann's Splint.

means of a bed truck. In many institutions this also is not feasible; either there is no bed truck, or the elevator is too small to accommodate the bed, or the doors are too narrow. Besides these objections, such transportation is most disagreeable to the patient unless it is made very slowly, because the slightest jar is promptly transmitted to the fractured limb in magnified form by the weights and pulleys of the traction apparatus.

Steinmann, who has done most to develop the method of nail extension, devised a splint for maintaining extension during transportation (Fig. 1). As the diagram shows, it is a hip splint having two rings: an upper padded one, set obliquely to fit snugly against the pelvis, and a lower one whose lower margin impinges against the projecting ends of the nail. The lateral bars connecting these rings are made in two pieces held together by a thumb-screw on either side, permitting adjustment. Needless to say, the splint is applied before traction is discontinued. There are three mechanical defects in this splint. The first is, that no provision is made for supporting the limb beyond where the nail lies;

hence any deviation of the limb as a whole from its correct position, either antero-posteriorly, laterally, or mesially, is bound to cause the corresponding displacement in the opposite direction at the point of fracture. The second defect is that no matter how carefully inserted, the nail almost never lies exactly at right angles to the long axis of the limb. There is no provision made for avoiding too much pressure on one end of the nail, and little or none on the other. Besides, such local mechanical adjustment could never be reliable, unless it were made exceedingly complicated. The third defect, as pointed out to me by Vernon the radiographer, is that the side bars being made of metal offer a serious obstacle in obtaining lateral exposures of the fracture.

With these objections in mind, I have devised a long hip splint (Figs. 2 and 3), reaching from the pelvis well beyond the heel. The upper padded ring is made in two halves which are hinged behind, while their free ends in front are locked with a thumb-



Figs. 2 and 3. Anterior and lateral views of transportation splint for nail extension cases.

screw. The lateral longitudinal bars are made of hard wood so as not to interfere with the *x*-rays; and the metal stirrup or cross-bar joining their lower extremities is composed of two overlapping slotted parts held together by a thumb-screw. The semi-circular support for the tongs is described below.

The splint is applied in the following manner: The thumb-screws at either end of the splint are loosened so that the oblique pelvic ring (heavily padded) is opened and its jointed halves are accurately fitted in place, the patient merely raising himself a little. As the ring is closed, the longitudinal bars and stirrup are adjusted. Slings of bandage material are passed behind the limb, at the middle of the thigh, the knee and the ankle. A metal arch with ends resting on the longitudinal bars, supports the Steinmann tongs and prevents them from impinging against the shin. Finally, the rope connecting the tongs and weights is firmly grasped and the weights are removed. Without lessening the traction, the

rope is fastened to the crossbar or stirrup. Once this is done, the entire limb may be moved by lifting the splint and this without causing pain or displacing the fragments.

The splint was used by me at the Knickerbocker Hospital last July (1913). At that time the side bars were of metal instead of hard wood.

## ASTRAGALUS INJURIES.

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For a bone of its size, carrying the entire body-weight, the astragalus has had too little attention paid to it.

Most men would have to think to locate it, and to think twice to describe its shape and functions.

The astragalus is a block-and-pulley bone,—all the tendons pass over it, most of them play in grooves on its surface.

Its function depends purely on its shape and its articulations. I have called it a "block," but it has a curious function, not to be classified in the terms of ordinary mechanics, for, owing to its peculiar form, and the strange obliquity of its lower joint-surfaces, it acts also as a transformer of the direction of motion—as a worm gear does in machinery. Through its presence between leg and ankle bones not only are the motions of flexion and extension carried out by the tendons that play over it as over a pulley, but a rotary motion is added, that of pro- and supination—a motion that occurs *only* in the joints between the astragalus and the other bones of the tarsus.

These movements, first accurately described, I think, in an article published in 1899\*, are all important in the mechanism of foot movements.

The hinge motion between tibia and astragalus is simple; the rotary motion below the astragalus is very complex and not to be supplied by any mechanical substitute.

Hence the importance of astragalus injuries, and injuries of other bones articulating with the astragalus.\*\*

Such injuries are not rare; they are confusing both from the variety of lesions possible and from the complexity of many of the individual lesions.

An excellent summary of the described lesions in this region may be obtained in the last (1912) edition of Stimson's *Fractures and Dislocations*.

For this paper, I have felt that a clearer perspec-

\*R. W. Lovett and F. J. Cotton, *Trans. Am. Orthopedic Ass'n*, Vol. XI.

\*\*For an account of the results of injuries of the os calcis involving the posterior joint between astragalus and calcis, see Cotton and Wilson; *Fractures of the Os Calcis*, *Boston Medical and Surgical Journal*, 1908.



tive might be given by a brief summation of personal observations,—résumé of an experience that may probably give a fair view of what lesions are *likely* to be met with, and hence to be expected and borne in mind, for after all it is the expected that always happens, if one is reasonably instructed as to what to expect.

The number of cases on which this paper is based would be hard to state, for there have been many astragalus luxations associated with fracture of the posterior tip of the tibia.\*

Also many cases involving the astragalus in its function are really calcis fractures—nearly 100 of these. What may fairly be called astragalus injuries will not total over two dozen, and not over a dozen that have been observed personally.

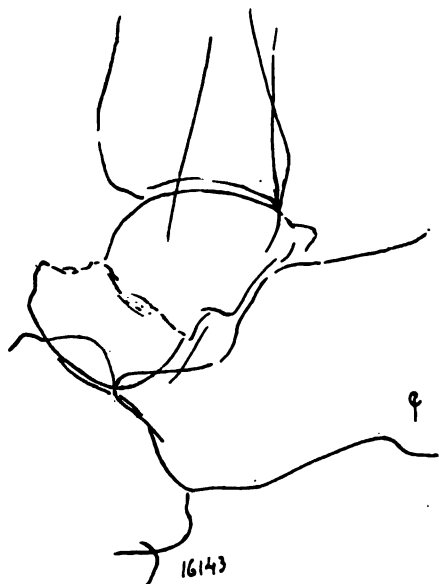


Fig. 1. Fracture of neck of astragalus, reduced.

These cases are divisible, roughly, into classes, as follows:

#### Fractures.

- (1.) Fracture of the neck.
- (2.) Simple split fractures of the body.
- (3.) Apophysis lesions.
- (4.) Transverse and oblique fractures of the body with luxation of fragments.
- (5.) Complicated fractures with luxations. Luxations.
- (6.) Forward of the astragalus and foot at the ankle, with or without complicating fractures.
- (7.) Backward of the astragalus and foot at the ankle with or without complicating fractures.
- (8.) Rotary double luxation.

\*See Cotton: Dislocations and Joint Fractures; Saunders, 1910, pp. 556 and 577. These cases have been gathered together in an article now nearly ready for the press. The fracture is a real type, not uncommon. I have been discovering so many at the hospital of late years that the house officers have dubbed it "Cotton's fracture."

- (9.) Subastragaloid luxation—inward.
- (10.) Subastragaloid—outward.
- (11.) Partial subastragaloid luxations.
- (1) *Fracture of the neck.*

This fracture is usually the result, apparently, of a fall in which the weight is received on the ball of the foot. In a case of E. G. Brackett's\* there was on one side, fracture of the os calcis, on the other, a break of the neck of the astragalus. The difference in trauma seemed to be that in one case the heel, in the other the ball of the foot suffered the impact of the fall.

The lesion here noted is illustrated in Fig. 1. In this case the slight deformity was reduced (late)

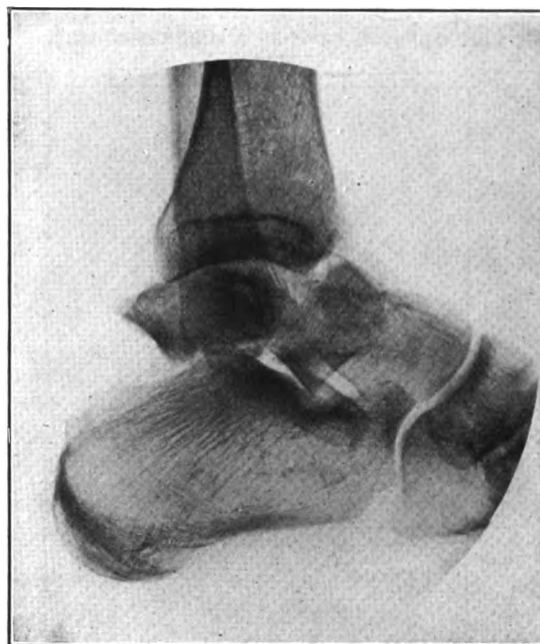


Fig. 2. Fracture-luxation of astragalus. November 17, 1912. (Radiograph by Dr. A. W. George.)

by the use of a Thomas wrench. The end result was good. In a third case the result, so far, is fair, the case is only convalescent.

Given a reasonably accurate replacement, union by bone and restoration of function are to be expected in this class of cases.

(2) *Simple splits of the body* of the astragalus. These cases seem not to be common.

I have, myself, seen but two.\*\* In one there was a split in the sagittal plane, without appreciable displacement.\*\*\* There was much soreness, but the result when last seen (convalescent) was very encouraging, and I understand that the patient recovered entirely.

In the second case the split was nearly horizontal,

\*See "Dislocations and Joint Fractures," Cotton: W. B. Saunders, Phila., 1910, p. 596, for plates of this case. See also Figs. 1093, 1094, 1095, 1096 for other cases of neck fracture.

\*\*Cotton: Loc. citat., Fig. 1101, for drawing of autopsy specimen of this lesion.

\*\*\*Ibid., Fig. 1100.



just below the upper articular surface. Clinically, the ankle showed nothing beyond localized soreness. This man left the hospital early. Results not traced.

### (3) *Apophysis lesions.*

The *apophysis* (os trigonum of the anatomist and embryologist) is a sort of spur extending outward behind from the astragalus (normally) of varying size. Often enough, after trauma, it is shown by the *x*-ray apparently separated or broken.

I am skeptical about these pictures. Certainly some of them, I think most of them, are cases of persistently separate ossification. I have seen two that I think were broken.\* In both cases there were other lesions that complicated the picture. I believe the traumatic lesion to be rare and probably of little consequence, save as a diagnostic trap.

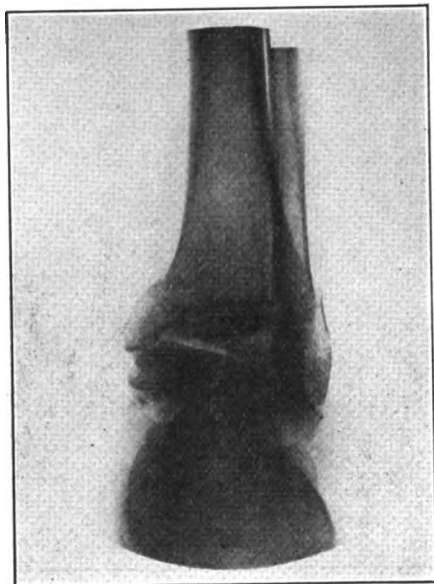


Fig. 3. Front view of the same case as Fig. 2, showing displacement of astragalus fragment laterally and the malleolar fracture.

### (4) *Body fractures with luxation of fragments forward and back.*

This lesion has interested me particularly, partly because of the obscurity of the condition—the lack of recognition of what I believe to be a type; partly because the practical problem of repair presents real difficulties.

Three cases of this lesion have presented themselves to me within the past two years.

The first patient, a vigorous young man of 35, a Swiss civil engineer on detail expert work in this country, referred to me by Dr. John Whitehead, of Salisbury, North Carolina, had been riding in the Carolina woods when his horse bolted and eventually caromed against one of the trees that are lamentably frequent in these “piney” woods.

Save that the foot was jammed between horse

and tree, there is no detailed information available as to the mechanism of the accident.

There were efforts at reduction. After two weeks I saw him. There were healed excoriations;

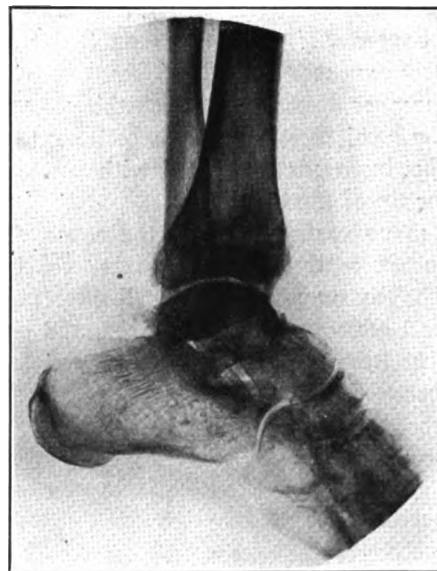


Fig. 4. Same case as Figs. 2 and 3. April 8, 1913.

more important, there were areas of actual necrosis from trauma—sheer crushing of tissue.\*\* (Note.) The conditions of bone damage are shown in Figs. 2 and 3.

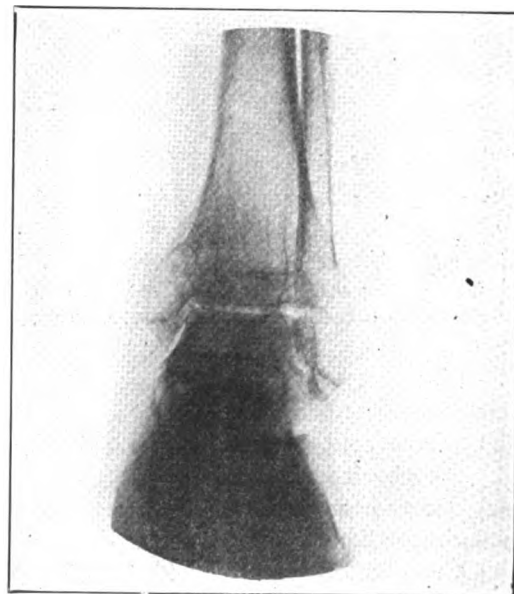


Fig. 5. Sagittal view of the same case. April 8, 1913.

It was three weeks\*\*\* after the accident when I cut down on the joint on both inner and outer sides, and effected a reduction by direct leverage on the

\*\*Note.—If one obtained sterilization and drying of tissue necrosed by traumatic pressure, it need not be a bar to open operation.

\*\*\*The delay was partly due to time lost in the early attempts at reduction, and in travel, but in part also to the necessary preparation for operation. My routine is alcohol to dry, after opening blebs, then cocoa-butter to soften; then the regular “two day prep.” that I exact in all bone and joint work—scrub, soap poultice, alcohol and 2 per cent iodine.

\*Cotton: *Ibid.*, Fig. 1095.

fragments with traction on the foot and rotary manipulation.

This reduction went unexpectedly well, and the foot was held in plaster without trouble.



Fig. 6. Second case of fracture-luxation of the body of the astragalus, before reduction. June 7, 1913. (Radiograph by Dr. A. W. George.)

Massage and regulated active (*not* passive) motions were begun early and persistently carried out. Later passive motions were added.

In this case there were associated malleolar frac-

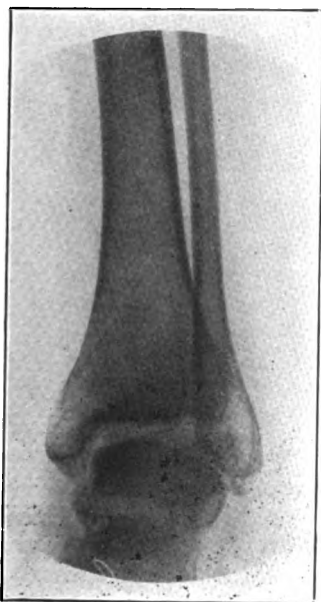


Fig. 7. Front of view of the same case as Fig. 6. No malleolar fractures save the tearing away of the extreme tip of the external malleolus. June 7, 1913.

tures and some lateral displacement that complicated matters.

This patient has now a solid ankle of absolutely normal appearance, but has (report from Baden, November, 1913) somewhat less hinge motion at

the ankle than I had hoped for, though the foot is a very serviceable one. (Figs. 4 and 5.)

A second case, very similar, occurred in a young woman who was mixed up with an automobile that "turned turtle."

Here, again, there was an oblique split of the body of the astragalus with luxation of the fragments forward and backward from the tibia.

In this case, however, there was no lesion of the tibia or fibula. (Fig. 6.)

There was the usual trouble and delay before operation from crushed tissue and blebs.\* Then reduction (with incision on both sides) by direct leverage—plaster, early active motion and use. In this case an early restoration of reasonably near normal function was obtained, but there was much trouble from damage to the trunk of the musculocutaneous nerve.

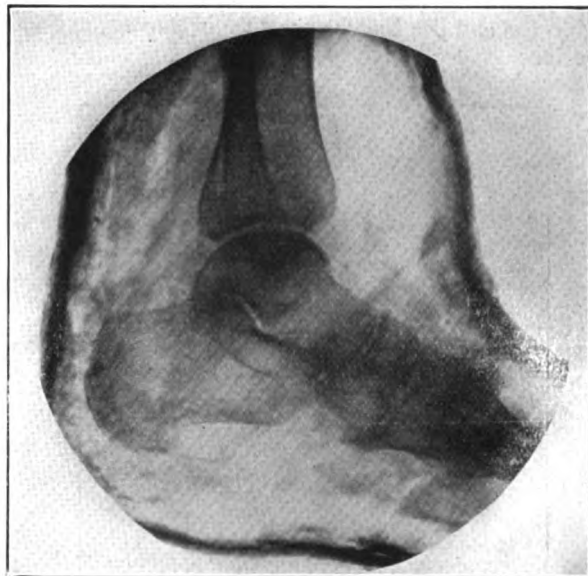


Fig. 8. Same case as Figs. 6 and 7, reduced and in plaster. June 20, 1913.

At last report, five months after operation, there was still slight limitations of all motions but a very serviceable foot.

The third case was one operated upon September 22, 1913, by invitation in the clinic of Dr. Edward Martin, at the University of Pennsylvania: the lesion was very like that of the last two, but of three months' duration, and obviously irreducible.

An attempt was made, after excision of the posterior fragment and extensive rupture of the new formed ligaments, to reduce the foot and the forward fragment backward to a serviceable position.

In this case the result seems to have been less successful, and despite exercises, etc., the man has not yet a very good foot: dorsal flexion, particularly, is decidedly limited, according to the latest report.

(5) There are certain *complicated fracture-luxa-*

\*In this case, again I dealt with blebs by alcohol sterilization, by opening of the blebs, with alcohol dressings to dry them, with cocoa butter to soften the dried layers, and then with my routine "two day" sterilization—scrub, alcohol, green soap poultice, sterile dressing; repeat after 24 hours; then sterile dressing; then 2 per cent tincture of iodine; then 2 per cent iodine early in the morning of day of operation, then 2 per cent iodine "on the table."

tions, hard to describe, of which the following may serve as an illustration:

D. J., aged —, came to the Boston City Hospital September 26, 1913. His foot was grotesquely displaced outward, and the circulation much interfered with, the skin tensely and dangerously stretched. There was a tiny wound that rendered the fracture-luxation compound. He was promptly etherized, and the lesion cut down upon.

What we found was a rotary luxation of the body of the astragalus inward, rotated over ninety degrees. The body, broken loose at the neck, torn loose from all connections (apparently), lay turned out under the skin; the foot with the astragaloid head lay inward in extreme pronation. The vessels and nerves were displaced forward. (Fig. 10.)

Reduction proved impossible until the tendo Achillis was cut. Then rotation and reduction were accomplished. The cut tendo Achillis was sutured, and in the end the foot was put up in plaster, in good position.

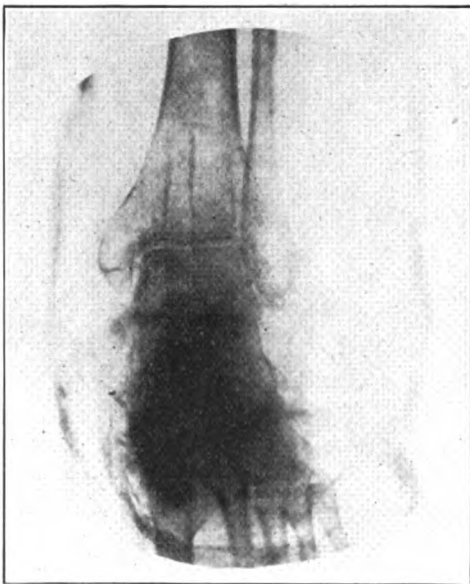


Fig. 9. Front view of the same case as Fig. 8. June 20, 1913.

This patient is now only convalescent. Evidently he is going to get a serviceable foot. Union is solid and bony. In this case the sloughing of bruised skin has brought about some delay but no joint infection or bone necrosis.

There are pure luxations of the astragalus as well as fracture cases. Commonest are luxations of the whole foot at the ankle with chipping off of one or another tibial joint-edge. Sometimes the luxation occurs without chipping (Fig. 11.).

(6) Here and there we find *forward luxation* with fracture of the front edge of the tibial joint surface; here, as a rule, the damage to the tibia is considerable.

(7) Much commoner is the *backward luxation* of astragalus and foot, associated not only with chipping away of the malleoli, but also with fracture and displacement of both malleoli. Such injuries

are rather common. Their importance rests largely on the loss of dorsal flexion due to the backward displacement of the astragalus and to the loss of any firm lateral support due to the slipping back of the astragalus out of the broken mortise which should hold it firm.

This lesion is treated in detail in a paper now un-

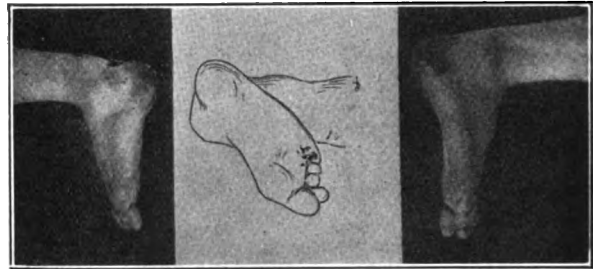


Fig. 10. Complete rotary luxation ("double rotary") of body of astragalus, compound. Photographs and sketch on the table before operation.

der construction; suffice it now to say that the important question is that of diagnosis; given a proper understanding of the condition, reduction is simple, and the results are no worse than those of the usual Pott's fracture.

The unrecognized, unreduced cases do extraordinarily badly.\* The reduced cases recover extraordinarily well.

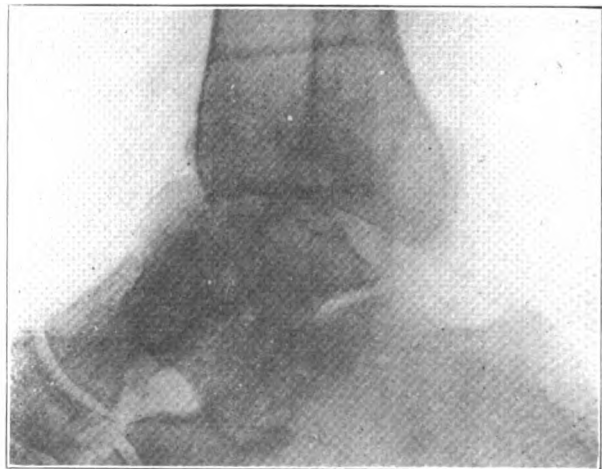


Fig. 11. Forward luxation of astragalus and foot at the ankle. No fracture save a minimal chipping of the internal malleolus.

(8) *Rotary luxations* of the astragalus without associated fracture seem to be a class established beyond cavil by the older literature.\*\* I am a bit skeptical about the common occurrence of such displacements without fracture. I have not seen such cases, but I have had the chance to see two cases in which this lesion is recorded in long-ago records of the Boston City Hospital.

\*Something, often much, can be done for these cases by late operation, but only upon the basis of a complete reconstruction of the ankle joint.

\*\*This is the same lesion shown in Astley Cooper's plate long ago. A like case but with outward displacement—a case of Dr. Lathrop's is shown in Cotton: Loc. cit., Figs. 1087-1088.

In these cases the accepted treatment of that time was carried out—astragalectomy.

Astragalectomy is a recognized orthopedic operation, but these two results, studied, would lead one to prefer a properly done amputation at the point of election.

One of these patients walks rather well, the other walks with a hitch, and has been practically a cripple since his injury, many years ago.

The astragalus is *not* a negligible mechanical factor.

(9) *Subastragaloid luxations.*

*Luxations beneath the astragalus* are common.

*Inward luxations* occur, apparently, from forced inversion of the foot.

The first case to be noted was in an Italian of 40 years, brought into the Haymarket Square Relief Station, August 26, 1906. He got mixed up with a derrick. On entrance, the right foot was shifted into marked inversion, with the head of the astragalus notably prominent in front, near the fibula. Under ether, traction and circumduction gained nothing. Only by having the assistant fix the head of the astragalus as far inward as it could be shoved, was reduction accomplished by circumduction of the



Fig. 12. Subastragaloid luxation of the foot inward. Sketched on the table before reduction. August 19, 1913.

foot. Reduction was perfect; I know nothing of the end-result as to function.

Another case seen August 19, 1913, presenting just the same picture, proved most difficult to reduce. What was in the way is not clear: at length by some fortuitous movement I got it back. The patient did well, but as usual in hospital cases, he disappeared into the maw of the out-patient clinics and there are no later data. (Fig. 12.)

Another case shows a similar luxation; in this case reduction was fully successful.\*\*

In the summer of last year, my house surgeon, F. B. McCarthy, successfully reduced a *compound* luxation of this type.

The case shown in Fig. 13 refused treatment and went home unreduced.

(10) *Subastragaloid luxations outward* are probably less common.\*\*\*

This autumn I have seen one case. This was in a

\*Cotton: Loc. citat. Fig. 1103. Note also Figs. 1102, 5, 6, 7, 10, and 11.  
\*\**Ibid.*, Fig. 1104.

man of fifty who twisted his foot (August 7, '13), in dropping off a car. He showed extreme deformity, with excessive prominence of the astragaloid head. The displacement of the foot out and backward was so extreme that one could hardly believe the fibula intact.

Reduction, however, proved easy under the relaxation of anesthesia and there were no fractures.

Examined December 12, 1913, he showed only a moderate scar—thickening about the head of the astragalus, had practically normal motion in all directions and could walk with only a slight hitch, and with little pain, even after prolonged use of the limb.

(11) There is a class that I cite with some hesitation—the *sub-astragalus sub-luxations*.

There have been three cases, two of them operated upon, that I can interpret in no other way than as inward sub-luxations of the foot beneath the astragalus. Clinically, they appear as a moderately

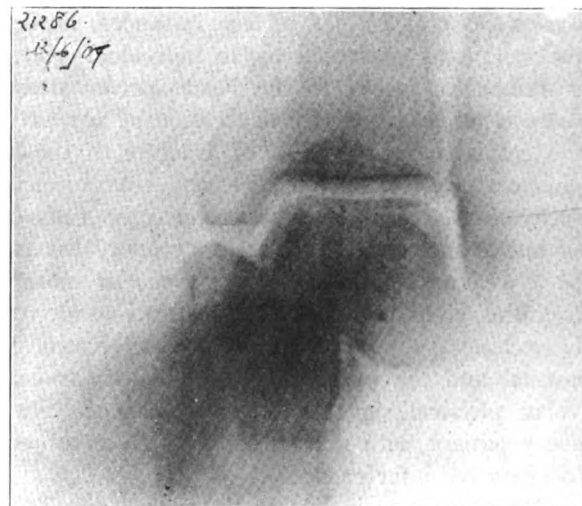


Fig. 13. Subastragaloid luxation of the foot inward.

marked club-foot of traumatic origin. Obviously there is no full luxation of the posterior calcaneo-astragaloid joint in these cases, but there is a real sub-luxation at the anterior joint and some displacement posteriorly. In one case, part of the astragaloid head had to be resected before reduction was practicable. Just what the original obstacle to a reduction is I can not say.\*

These are notes, not of all the things that may happen, but of what I have chanced to see and to have to treat. This class of injuries, while not rare, are rather unfamiliar, and are apt not to be clearly understood. Their importance, in the sense of the lamentable results of failure to recognize them, is the excuse for this detailed account of individual cases.

Recognized and adequately handled, these cases do so well that it is worth while to be ready to meet them adequately when they are encountered.

\*See Cotton: Loc. citat., Figs. 1116, 18, 19, 20, 21, 22, 24, 25.

## SOME IMMEDIATE AND REMOTE RESULTS OF FRACTURES OF THE SKULL AND OF THE SPINE.

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The chief importance of a fracture of the skull arises from the injury caused to the brain and to the other cranial contents (nerves and bloodvessels). Hence, a consideration of some of the effects of fracture of the cranial bones has to deal mainly with the symptoms due to brain or nerve disturbance.

In many cases the cranial injury is of such severity that death is either immediate or occurs within a few hours. In not a few instances, however, the symptoms presented by an individual who has sustained an injury to the head are not definite, there is no evidence of a depression of any part of the cranial vault, no signs of fracture of the base (hemorrhage from the ears, subconjunctival ecchymoses, etc.). The patient may be fully conscious, he may be drowsy or in a stupor, there may be a weakness or a paralysis of one or more extremities, signs of irritation of sensori-motor tracts (twitchings or convulsions), exaggeration of normal and the presence of pathological reflexes. What physical signs are of importance? Should every patient with marked symptoms be subjected to operative interference?

Many surgeons incline to the view that all fractures of the skull should be operated upon; that an exploratory incision will do no harm; that a positive diagnosis can be made only by that means; that post-traumatic epilepsy is less frequent when fractured bone—even if there is no depression—be removed.

It has been my experience that the immediate and remote results of conservative treatment are very satisfactory, and I can see very little reason why a fracture of the skull without dislocation of the fragments and with few brain symptoms should be operated upon any more than a fracture anywhere else in the body.

Nor am I convinced of the correctness of the view often expressed, that epilepsy more often follows in those who have not been operated upon. It is mainly a question of correct diagnosis. If an individual is not operated upon who has depression of bone, a laceration of the dura and brain, or a large intradural clot, of course the statistics of the

frequency of epilepsy will be higher in the unoperated. In my experience, about one-third of all patients who have had a skull fracture develop, after one or many years, either Jacksonian or generalized epilepsy. In a very small number of these patients, operative interference will reveal a cystic collection of fluid, and with the evacuation of this fluid, the convulsions will cease. In a still smaller number of patients the attacks seem to be due to adhesions between the cortex and the membranes. In the majority of instances, very little is found at operation to explain the convulsive seizures, and, unfortunately, only a very few of the patients will be permanently relieved by the interference, no matter whether the surgeon divides adhesions or excises part of the cortex of the Rolandic area, and no matter whether the osteoplastic flap is replaced or whether a large bone defect be allowed to remain.

The indications for operative interference in fracture of the skull should be based upon the diagnosis of the condition present in the individual case, and upon the question whether there is a stationary or an advancing lesion. The fact that the patient is drowsy or in a stupor is not of itself an indication for operation, for an individual with so-called cerebral concussion without bony fracture or gross injury to the brain, may remain in a stuporous condition for many hours. It is a different matter if the stupor becomes deeper and if more and more evidence of increased intracranial pressure appears.

Congestion of the retinal veins and slight pinkish color of the discs occur with great frequency after simple fissured fractures of the skull, but if frequently-made ophthalmoscopic examinations reveal increasing changes in the fundi, we may be certain that the intracranial lesion is advancing.

That an individual has a weakness or paralysis of one or more limbs immediately after having sustained an injury to the head, does not mean that operation is indicated, for the operation will often fail to show a lesion that can be remedied by the surgeon. On the other hand, the progression of the symptoms—weakness increasing up to complete paralysis, twitchings increasing up to convulsions—is an evidence of an advancing process in the cranial cavity.

Nor is it necessary or advisable to operate upon every patient who presents symptoms of fracture of the base of the skull. If there are no evidences of greatly increased intracranial tension, operation can be safely delayed; if symptoms due to pressure from blood or from edema of the brain tissue appear, there is always time enough to perform a

decompressive operation. The surgeon who performs *well-timed* rather than *immediate* operations will be bound to have the best results.

I have become accustomed to group patients with fractures of the skull into the following classes:

1.—*Patients with evidence of fracture of the vertex* with few or no brain symptoms, no loss of consciousness, no twitchings, paralysis or convulsions. These patients need not be operated upon, but they must be carefully watched for the appearance of new symptoms. At any time during the course of a number of days after the head injury, they may develop signs of cerebral compression due to slow venous bleeding or to edema of the brain. The pulse and respirations must be taken at short intervals and the eye grounds carefully examined every few hours. If the symptoms show a tendency to progress and are well localized to one part of the brain, the surgeon may be in doubt whether there is increasing extradural or intradural hemorrhage. An exploratory puncture of the skull may then have to be done and it can often be accomplished under local anesthesia. A small drill hole is made through the soft tissues of the scalp and the bone, and a blunt pointed aspirating needle is passed through the drill hole until the dura is reached. If aspiration fails to reveal blood, the needle is pushed through the dura and aspiration is again done. By this means we are able to determine with certainty whether there is any considerable collection of blood inside or outside of the dural sac. If the symptoms become more marked, still a subtemporal decompression may become necessary.

2.—*Patients with partial or complete loss of consciousness*, weakness of one side of the face, marked weakness or paralysis of the upper or lower limb of the same side or of both limbs, exaggerated tendon reflexes with ankle clonus, show pulse and respiration. These patients have either a marked depression of bone or a large extradural or intradural collection of blood, and must usually be operated upon. The operation that must be done is either removal of depressed fragments of bone, removal of extradural extravasation of blood with ligation of a bleeding middle meningeal artery, or incision of the dura with removal of a subdural collection of blood and treatment of lacerated brain tissue. If none of the conditions just mentioned is present, a subtemporal decompressive operation should be done.

3.—*Patients in whom few symptoms are present at first, but who develop after a few days signs of increased intracranial pressure* — papilledema, drowsiness, respiratory disturbances, slow pulse. The symptoms are due either to slow venous hemorrhage or to edema of contused brain tissue. If the

signs point to a localization of the compression of the brain, an exploratory trephining must be done over that region; otherwise a subtemporal decompression is indicated.

4.—*Patients with the signs of fracture of the base.* As soon as any symptoms of increased intracranial pressure appear, a subtemporal decompression must be performed.

Experience has shown that patients who have sustained an injury to the head may, after a number of months, develop an abscess of the brain. In an individual, therefore, who a number of months after a cranial injury, presents rapidly increasing brain symptoms, the suspicion of a brain abscess is justifiable.

Recently, there was admitted into the Second Surgical Service of Mt. Sinai Hospital a man of 24 with mental disturbances, twitchings of the left side of the face and left upper extremity and beginning optic neuritis. The patient had never had any ear trouble but dated the symptoms back to a fall from a ladder some three months before. He had not lost consciousness at the time of the fall, was able to continue with his work, but complained of frequent headache from that time on. The marked cerebral disturbances developed a few days before his admission to the hospital. Within 24 hours of his admission, the left upper extremity became paralyzed and a weakness of the left lower extremity developed. Operation was performed on the day following, and disclosed a large abscess in the right parietal lobe.

#### FRACTURES OF THE SPINE.

There is no more deplorable accident than a fracture of the spine with crushing of the spinal cord. A young man dives in shallow water, striking upon his head, a young woman falls out of a hammock or down a flight of stairs, a workman is struck in the back by a heavy weight. At once there is a more or less complete paralysis of the lower or the lower and upper extremities, with loss of all sensation, disappearance of superficial and deep reflexes and of control of the bladder and rectum. Lumbar puncture shows bloody fluid, the x-ray examination discloses a fracture of one or more vertebrae. Many of these patients live for a number of weeks, remaining paralyzed, the final outcome being ushered in by high and irregular fever. Others remain alive for many months or for several years, and succumb to bedsores and kidney infections. In a very few, improvement follows: the reflexes return, motor and sensory powers return to a considerable extent, and after many months or years, the patients are able to get about on crutches or with canes. The improvement which occurs is an evidence that there could not have been a complete transverse crushing of the



cord. Such a course is rare, however, and the symptoms of a complete transverse lesion of the cord will generally persist to the end uninfluenced by operative treatment. Therefore it is useless to subject these patients to operation, and the surgeon must not be misled by the return of some of the tendon reflexes. I have, in several instances, observed a very slight knee-jerk return for a few days, many weeks after a complete transverse crush of the cervical cord. One of the reasons why laminectomy for fracture of the spine has fallen into considerable disrepute is that so many patients with a hopeless lesion have been operated upon.

It is quite a different matter with those patients in whom the paralysis is not complete, in whom there is not a complete loss of all sensation up to the level of the injury, in whom some of the reflexes persist and are perhaps exaggerated. The majority of these should be operated upon as soon as possible after the injury, especially if *x*-ray pictures show marked distortion of the spinal canal by fractured bone or dislocated bodies of the vertebrae. It has been my experience that those patients who have marked root pains are very favorable cases for operative interference, while in those who are free from pain, the outlook for great improvement after the operation is not so good.

Some patients have few symptoms from a spinal fracture because there is little or no dislocation of the fragments, but many months or years later, they begin to show symptoms of interference with the functions of the spinal cord. The symptoms are often due to narrowing of the spinal canal by a new growth of bone, or callus has caused a more or less marked angulation of the cord with pressure upon nerve roots. These patients can be entirely relieved of their symptoms by a wide laminectomy, which relieves pressure upon the cord and nerve roots and straightens out the angulation by allowing the dural sac to bulge backwards.

It is a well known fact that slight trauma of the spine may be the starting point of a hematomyelia, and it is very possible if not probable that injuries of a mild character may be an important etiological factor in many cases of spinal disease. If one carefully inquires into the history of many patients with spinal diseases, it is quite remarkable that one will very often learn of an injury to the back which preceded the spinal affection by many years.

Severe localized pain after traumatism, especially in children, may be due to subperiosteal fracture. Extreme localized tenderness is the chief sign; abnormal mobility and deformity are absent, and crepitus may not be elicited.

## FRACTURE OF THE SKULL: THE ROENTGEN RAY AS AN AID IN ITS DIAGNOSIS.

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The skull is described as "A superior expansion of the vertebral column as if composed of four vertebrae, the elementary parts of which are specially modified in form and size and almost immovably connected, for the reception of the brain and special organs of senses."

The structure and dome shape of the skull with its double deck of compact substance and intervening cancellated material, its ribs and bridging and tressling, its thickened protuberances at prominent and susceptible points, the peculiar dovetailing of the sutures, its shape and moveability, the elasticity of the outer table, the overlapping of some bones, the density and mobility of the scalp (and in youth the number of bones having a tendency to break up the force of a blow) all combine to make this casing for the vital structures resilient to external violence. It has, however, due to lack of uniformity of thickness, weak points which are particularly susceptible to injury. One has only to hold the base of a skull to a light and view from the inside to note these weak points. They are the centers of the orbital plates of the frontal bones, the middle cerebral fossa, the center of the squamous portion of the temporal bone and the center of the inferior occipital fossae. These thin points seem to have a direct bearing upon the location of fractures, particularly of the bursting linear fractures extending into or originating in the base from blows on the thicker expanse of bone forming the vault or blows on the point of the jaw or from violence transmitted upwards from the spine, as falls on the buttocks.

Because of the shape of the skull, its elasticity, its closely fitting covering of skin, muscle and fascia and periosteum on the outside, and the pressure of the intracranial contents and presence of a second periosteum, the dura mater, on the inside, fractures of the skull have a strong tendency to immediately replace and maintain themselves in position. For this reason a fracture of the skull itself subsides into secondary importance. The vital considerations are the amount of injury to the blood-vessels, intracranial nerves, dura and brain substance, and the opening up of possible avenues of infection, meningitis, cerebritis, encephalitis, abscess, epilepsy, insanity, softening, secondary traumatic insanity, post-traumatic psychoses and post-



traumatic neuroses. But as a clue to the location of the serious lesion the fracture is of utmost importance.

It is a noteworthy fact that each succeeding collection of statistics of the relative frequency of fractures give fractures of the skull an increasing percentage. Thus:—Gurlt gave 1.45%; Von Bruns gave 3.4%; Chudovsky gave 3.8%. These figures we believe, in view of more accurate diagnosis with the *x*-ray, altogether too low. If a systematic *x*-ray

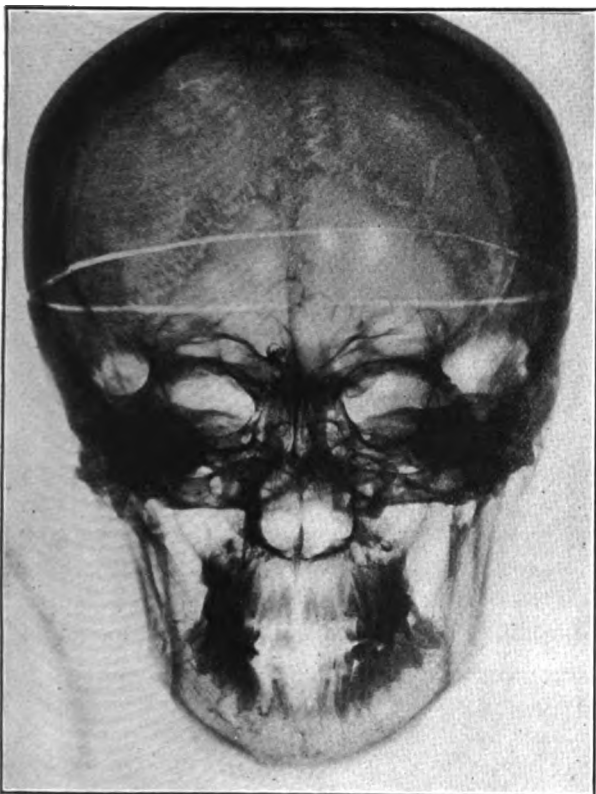


Fig. 1.—Showing frontal region.

examination were made of all injuries of the head, direct or indirect, we are sure it would be demonstrated that the relative frequency of fractures of the skull would show a much larger percentage.

Every skull receiving violence, imparted either directly or indirectly, with or without symptoms of intracranial injury should be considered possibly fractured until proven otherwise. Fracture of the skull can result from apparently trivial causes without any external manifestation of an injury and without any symptoms of intracranial injury. The *x*-ray frequently demonstrates a fracture of the skull where there were no symptoms, nevertheless it is very important to diagnose a fracture for the possible occurrence of remote sequelae, etc. *From our experience we have no hesitancy in saying that the majority of fractures of the skull are not diagnosed as such and remain undiscovered.*

For these reasons, we venture to emphasize the aid that can be rendered in discovering and locating these fractures by means of the Roentgen ray. In a hurried review of the English literature on the subject we failed to find one instance where the *x*-ray was used as an aid in the diagnosis of fractures of the skull. Most of the text-books urging the necessity of positive diagnosis in fracture of the skull, yet fail to mention the *x*-ray.

The following statements, by recent writers illustrate the necessity of making a correct diagnosis of fracture of the skull, yet fail to mention the advantageous use of the *x*-ray.

Scudder says, "It is not an uncommon experience for the surgeon to be called to an individual who is unconscious following a blow on the head. A

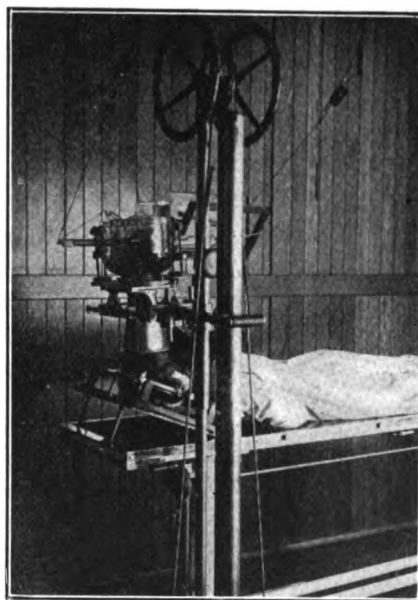


Fig. 2.—Illustrating position to obtain photograph shown in Fig. 1.

swelling is evident on the top or side; palpation reveals a hematoma. *It is sometimes impossible to distinguish between a hematoma and fracture of the skull.*" Again he says: "A knowledge of the nature of the fracture will help in determining the injury in the brain—as a linear fracture of the vault with rupture of the middle meningeal artery."

William Barton Hopkins says in his Clinical Treatise of Fractures, "A mere fissure in the vault of the cranium accompanied by moderate and temporary symptoms of concussion of the brain will almost inevitably escape detection, for no sign indicative of its existence can be felt through the scalp." Again he says: "If there is a wound leading to the seat of the fracture, the existence of the latter being immediately revealed, its proper management may be often definitely determined upon without regard to the presence or absence of

cerebral symptoms." "It must be mentioned, however, in qualification of this statement, that there is a certain number of fractures of skulls, especially of limited areas in which localization is of inestimable value in indicating with extraordinary precision the site of the lesion, while as already stated,

Thus is advised compounding a simple fracture in order to make a diagnosis when the *x-ray* will very much more easily aid one.

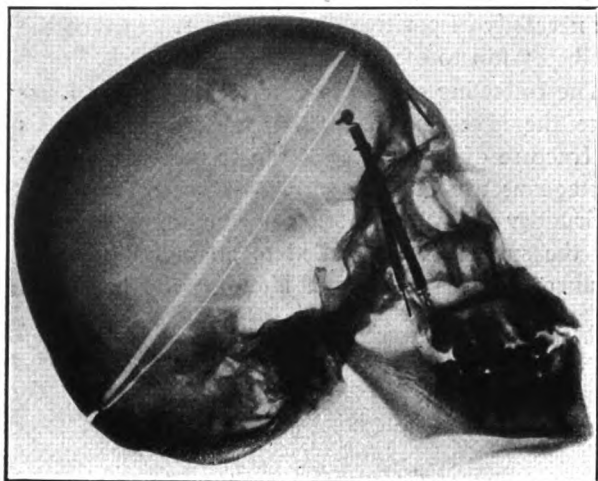


Fig. 3.—The lateral view, temporo-parietal region.

an intracranial lesion at any point may produce general symptoms identical in all respects with those due to fracture, when such symptoms are present, fracture being the removable cause, *it becomes a matter of first importance to prove or eliminate its presence.*"

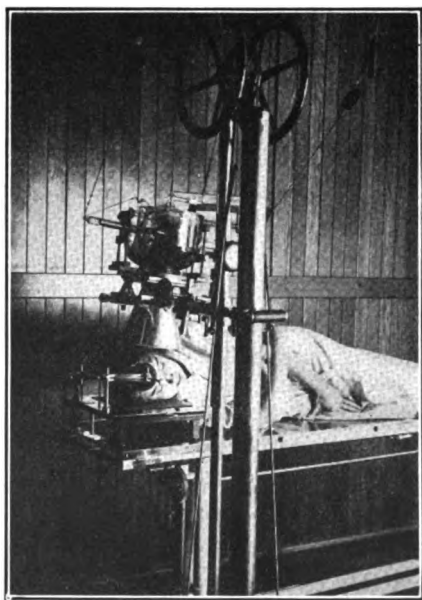


Fig. 4.—Illustrating position to obtain photograph shown in Fig. 3.

E. A. Babler says that, "Every hematoma of the scalp should be exposed, thus the diagnosis must be made by exploration of the hematoma or laceration or by palpation."

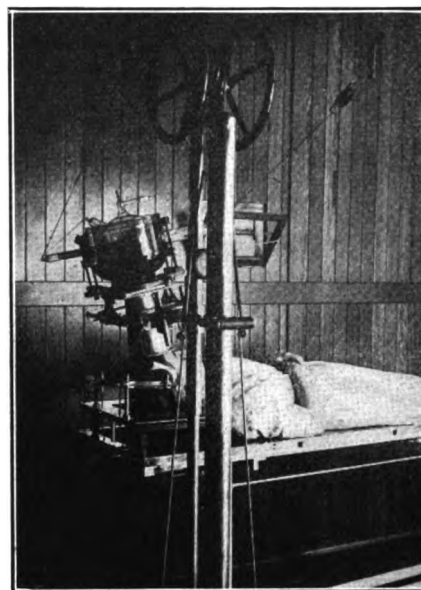


Fig. 5.—Illustrating position to obtain photograph of occipital region shown in Fig. 6.

John B. Murphy in "Practical Medicine Series for 1912" says, "personally the author has been impressed with the frequency with which a patient with an apparently insignificant hematoma or laceration was admitted with a normal temperature and mentality, and yet careful examination would

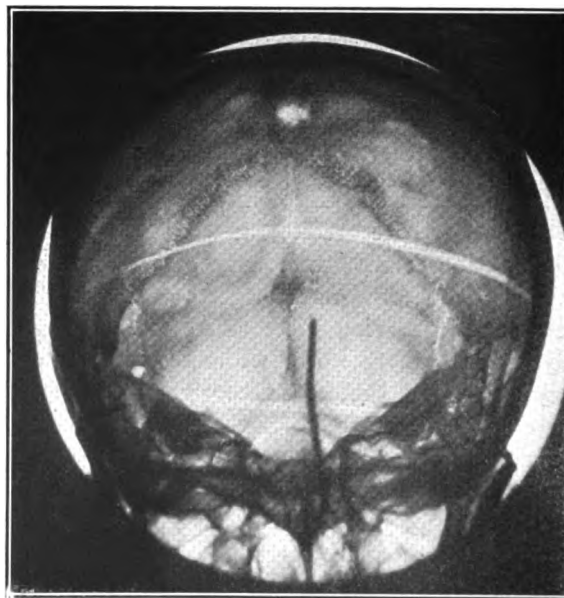


Fig. 6.—Showing occipital region.

show a depressed fracture of the vault with more or less injury to the brain."

It is interesting to note that Cushing does not

mention the *x*-ray in fractures of the skull but advises exploration to diagnose a depression.

We are all conversant with a number of cases where the fracture with a lacerated bleeding artery is remote from the point of injury. See the inestimable value of localization by the *x*-ray in these cases.

The frequency with which fracture of the skull is mistaken for various other conditions, especially in cases of coma, calls for any method which will make a rapid and positive diagnosis. There is a



Case 1. Age 10 years. Patient said to have fallen into a subway excavation a distance of 6 to 8 feet. Shows a sagittal fracture involving the vertical plate of the frontal bone.

number of cases of fracture of the skull in which the diagnosis can be made only by the *x*-ray. We refer to those which have no symptoms, either objective or subjective, only a history of a fall. In the Harlem Hospital every patient who receives a blow on the skull or point of the lower jaw, either directly or from a fall, is considered as suffering from a fractured skull unless proven otherwise. The signing of a release holding the hospital blameless is always required when such a patient desires to leave.

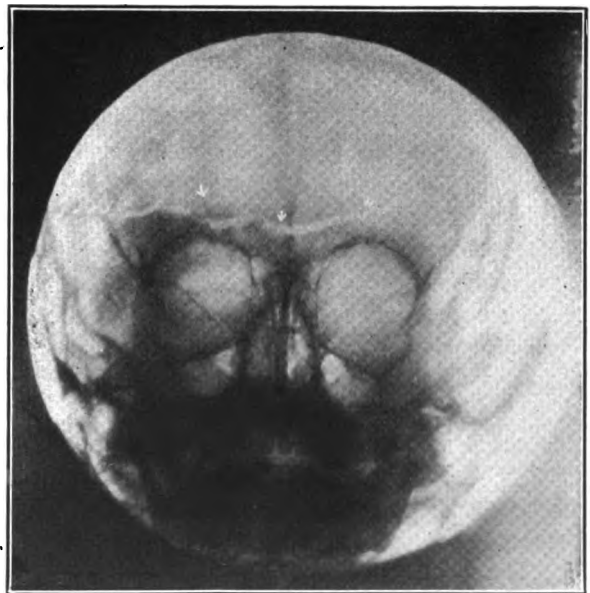
With the advent of warm weather comes the open window, the use of the streets and yards as playgrounds, the roofs and fire-escapes as sleeping places; these factors are the source of many accidents in children, and common among them is the fractured skull. The elasticity of the bones of the skull in children is largely accountable for the rarity of basilar involvement, this is in marked contrast to this injury in adults, where authorities claim 80% of linear fractures of the vault extend into the base. The frequency of a serious fracture in



Case 2. Age 10 years. Post-operative. Patient while running across the street is said to have plunged head first into the guard iron of a street car. X-ray findings show a complete absence of the left middle portion of the vertical plate of the frontal bone.

small injuries of the head in children and the apparent insignificance of such fractures has been often observed. That skulls of children fracture easily without injury to the brain or bloodvessels is the conclusion. When there is some injury to the vital tissues the extensive nature of the fracture relieves the tension, in other words the skull decompresses itself.

Just why the radiographing of the skull for a possible fracture like radiographing any other bone for diagnostic purposes has been so generally neglected, practically ignored, is one of those pecu-



Case 3. Age 8 years. While playing, the child fell from a shed roof, a distance of about 15 feet, striking on her head. Marked fracture with considerable separation extending from the left parietal bone.

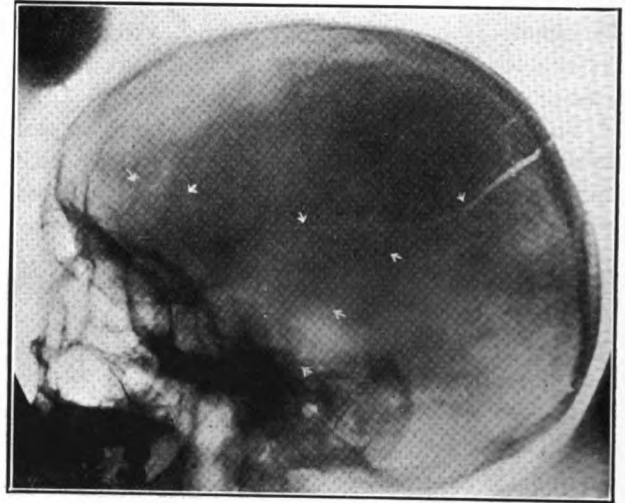
liar anomalies that creep into the routine work of medical practice.

Patients are often in a comatose or irritable con-

paralysis are present, they are a clue to the possible site of the fracture and attention is naturally directed toward that region; this must not mislead



Case 4. Age 17 years. Patient fell three stories striking on his head on a stone pavement. The radiograph reveals a linear fracture of the right parietal bone low down, extending downward into the squamous portion of the temporal bone to the region of the external auditory canal.



Case 6. Age 16 years. Patient was hit upon the head while watching several boys playing dice. X-ray finding: "A long forked linear fracture extending from the upper portion of the occipital and horizontally across the left parietal and temporal into the frontal bone; the lower fork extending downward and terminating in the petrous portion of the temporal bone."

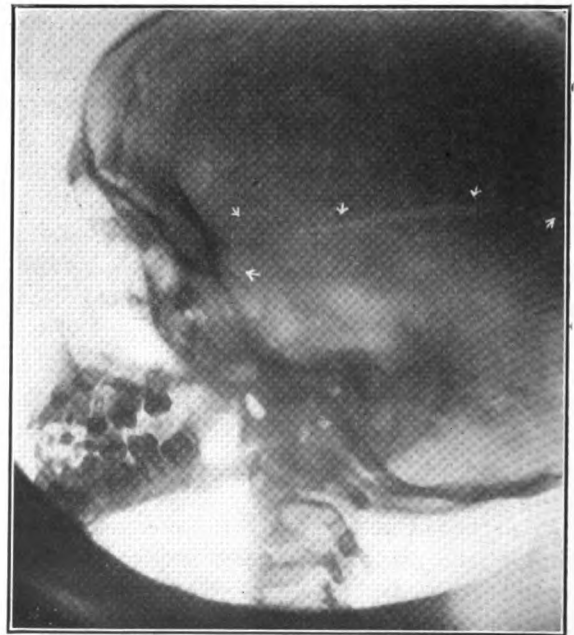
dition when referred to the Roentgenologist, and a great deal of patience and perseverance is required. It must be constantly borne in mind that the minimum amount of disturbance and movement is the

one, however, for every case should have the frontal, parieto-temporal and occipital regions radiographed.

In the examination of the frontal region we



Case 5. Age 5 years. Patient said to have fallen off a fence to the stone court below, striking on his head. X-ray findings revealed a vertical fracture of the right parietal bone extending downwards into the petrous portion of temporal bone.



Case 7. Age 12 years. Boy fell from the first story fire escape to pavement below, striking on his head. Radiographic examination reveals a long linear forked fracture of the right parietal extending horizontally and downward into the greater wing of the sphenoid bone.

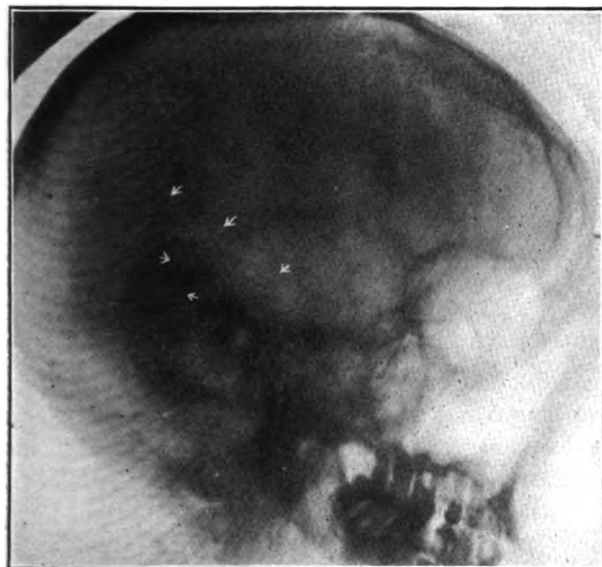
rule. The head must be absolutely fixed and all respiratory movement overcome.

If the objective symptoms, such as bleeding from the ear, laceration of the scalp, hematoma or

should endeavor to show on our radiographs as much of the vertical plate of the frontal bone as possible, as is shown in Fig. 1, taken from the dried specimen. This is best obtained by placing



the patient flat on the abdomen, with the head, face down, resting on an inclined plane at an angle of 25 degrees. A small cone having an outlet of about five inches is used; the vertical axis of this cone represents the central ray and should be centered on the glabella and directed straight down (see Fig. 2). A tube is used of rather high vacuum which will take about 45 to 50 milliamperes, and an exposure of about 5 seconds is given. This procedure, in the majority of cases, will give us satisfactory radiographs of this region. It is, however, frequently the case that our patient's condition will

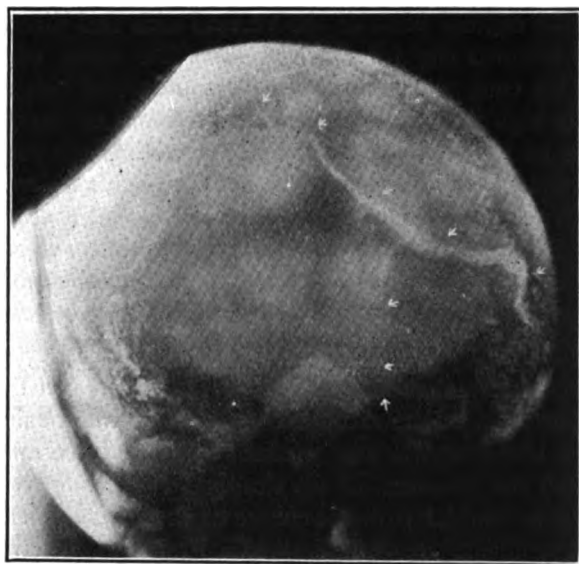


Case 8. Age 40 years. Patient fell on flight of stairs. Was picked up unconscious. X-ray shows a stellate fracture in the region of the posterior inferior angle of the parietal, one arm running forward across the squamous portion of the right temporal bone and one upwards into the parietal, and one downward into the mastoid.

not allow the manipulation necessary to place him in the above position. The procedure must then be reversed, the tube being placed beneath and the plate above.

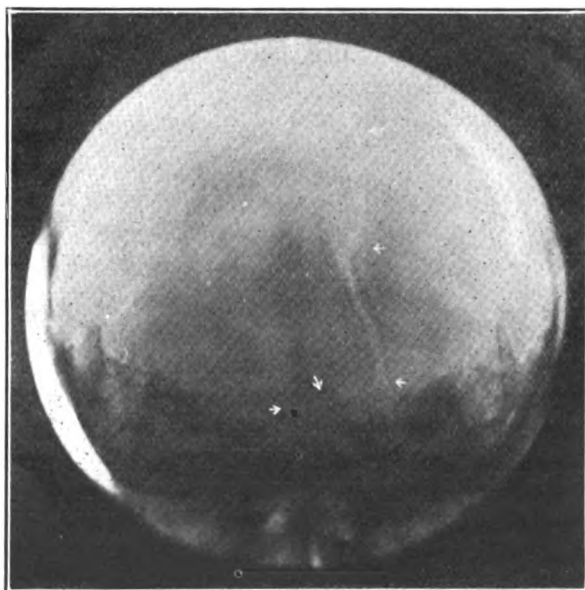
In radiographing the temporo-parietal region we should show that portion of the skull lying between the sagittal suture above, the coronal suture anteriorly, the lambdoidal suture posteriorly and including the entire temporal bone. Both sides of the head must be examined (Fig. 3 illustrates the correct lateral view). The patient lies on the table with the head resting easily on a raised platform having a special adjustable fixation apparatus attached (see Fig. 4). A cone with an outlet of 7 inches is used. The central ray should be centered at about the mid-temporal region and an imaginary line extending from the frontal eminence to the center of the chin, should be parallel to the lower edge of the cone, this will overcome any conflicting shadows from the opposite side of

the head. The same conditions govern the tube as when examining the frontal region, except that the exposure should not be over three seconds.



Case 9. Age 10 years. Patient was hit by a surface car. X-ray findings revealed a fracture beginning high up in the occipital bone over the superior longitudinal sinus extending downward and to the right, passing over the right lateral sinus and ending in the mastoid portion of the temporal. From about the middle of the lateral sinus a fork extends downward parallel and to the right of the occipital sinus, terminating in the foramen magnum. Between the downward fork and the torcular Herophili is a small triangular piece of bone freely movable through the scalp with crepitation. There was no cerebral or other symptoms in this case indicating a fracture of the skull. He was admitted to the hospital for a fracture of the femur.

The occipital, the most difficult of the three regions, is best examined by having the patient lie on the back, the head resting on the raised platform with the chin *sharply flexed*. This brings the occi-



Case 10. Age 11 years. Patient said to have been struck by a surface car. Radiograph shows a line of fracture beginning to the right of the sagittal suture in the right parietal bone, extending backward and downward across the right lateral sinus, dividing, one fork going forward and ending in the mastoid portion of the temporal and the other downward into the foramen magnum.

put flat down on the plate (see Fig. 5). Fixation having been made, a cone with an outlet of four inches is used, the vertical axis being centered on the foramen magnum; the tube is placed at an angle of 15 degrees back of the vertical axis and directed towards the foramen magnum, the upper edge of the cone being just above the supraorbital ridges. The high vacuum tube is again used and an exposure of five seconds is made. (A radiograph such as shown in Fig. 6 should be obtained—this is from a dried specimen).

A hypodermic injection of morphine, where much irritability is present, will aid in obtaining satisfactory radiographs.

#### INTERPRETATION.

The normal radiating lines of the grooves in the inner table of the skull, accommodating the meningeal blood vessels, cast shadows which may be mistaken for fractures of the skull. To one, however, who is familiar with the course of these vessels it is not difficult to differentiate. Fractures usually show in the radiographs as light, sharply cut lines of varying width, depending on the amount of separation. These fracture lines are usually at direct variance with the shadow lines of the meningeal grooves.

The radiographs here reproduced illustrate fractures in the frontal, temporo-parietal and occipital regions. Arrow heads outline the fractures.

In very many cases it is not necessary to the diagnosis of fracture to elicit crepitus and abnormal mobility—often painful manipulations. In several forms of fracture there are other positive diagnostic evidences. Thus, with Colles' fracture the level of the styloid of the radius will almost always be found to have receded from beyond that of the styloid of the ulna. Moreover, *x*-ray examinations save much painful manipulation.

The radiograph of the elbow of a child shows shadows of numerous epiphyses. One inexperienced with *x*-ray plates is very apt to mistake one or more of these for fractures. When examining the skiagraph of a child's elbow suspected of fracture or dislocation, it is, therefore, important to have the normal picture in mind, or better yet in hand, for comparison.

Fractures of the head of the radius are probably more common than generally supposed, being overlooked frequently because of the absence of the ordinary signs of fracture.

## THE OPERATIVE TREATMENT OF FRACTURE OF THE OLECRANON.\*

A. W. SHEA, M.D.,

NASHUA, N. H.

Fracture of the olecranon, while comparatively infrequent, demands as much care and judgment in its treatment as do other similar lesions about the elbow joint.

As an extension of the ulna, the olecranon completes the lever of the forearm, the fulcrum being at its narrowest and weakest point, opposite the convex articular surface of the humerus. Here the injury usually takes place. The bone is, however, strong and tough, and is further reinforced by an expansion of the aponeurosis of the triceps which extends downward for some distance beyond its insertion.

Whether the fracture is caused by direct or by indirect violence, the degree of separation of the fragments determines the conditions found, which are loss of extension, tearing of the periosteum and fibrous tissue, swelling and effusion into and about the joint, which is almost always involved.

As in other fractures, bony union is the only perfect union, and while many cases with ligamentous connection give good and useful joints if the fragments are not too far separated, yet it is obvious that with one arm of the lever shortened the power of the triceps can never be as great as if the entire bone were intact.

Subperiosteal fractures and those of greater degree where the fragments can be brought into direct apposition are no doubt best treated conservatively by proper splint and fixation.

Where the separation is a half inch or more, a good, strong joint cannot be expected unless some more radical plan of treatment is followed. I have recently had an opportunity to care for three such cases, and in each, contrary to the usual statement, there was a large fringe of fibrous tissue over the ends of the broken bone, similar to that seen in fracture of the patella. The wider the separation, with consequent laceration of the soft tissues, the greater is this liability. This condition of itself would prevent bony union, even were it possible to bring the parts together without operation.

The usual method followed in operative cases is to drill the bony fragments and to hold them together with some form of suture, either wire, kangaroo tendon, or chromic gut. This is done either by an open incision or subcutaneously. Many cases do not result in bony union.

\* Read at the 22d Annual Meeting of the New York and New England Association of Railway Surgeons.

In three cases in this report the following operation was done: A longitudinal incision was made with its center over the point of fracture. All blood and clots were washed out with salt solution. The fragments were brought together, care being taken to prevent any intervening fibrous fringe. A strand of silkworm gut was passed through the tendon of the triceps just above its attachment to the bone. The ends of the gut were brought down on each side of the bone to a point an inch below the fracture, then out through the fascia and skin, where they were tied over a small sponge. This held the bone firmly, but it was further reinforced by suturing the periosteum and fibrous tissue at the line of fracture with chromic gut. The wound was closed and the arm put up in plaster of Paris dressing in position of slight flexion or natural extension.

The wound was dressed through a window in the plaster, the sutures removed in a week and the silkworm gut stay at the end of three or four weeks.

Case I, male, laborer, aged 26, had a compound fracture of the right olecranon. The wound was enlarged longitudinally and operation done as noted. The stitches were removed in a week and the silkworm strand in three weeks, and a few days later passive motion begun. He secured a perfect bony union and full use of the joint.

Case II, male, lumberman, aged 58 years, received a fracture of the right olecranon and of the surgical neck of the humerus from a fall. The fragments were separated an inch and one-half, and there was great swelling and contusion of the soft tissues about the elbow joint, with complete loss of extension. The fracture was reduced as in the former case, and a small rubber drain was placed beneath the skin for 48 hours. The silkworm gut was left in position for four weeks and passive motion delayed till the same time on account of the fractured humerus. He got perfect bony union, went to work at the end of eight weeks, and has recovered full motion in the joint.

Case III, female, aged 48, thrown from a carriage and fractured the left olecranon and the left femur. The same operation was done on the olecranon, which was separated over an inch; the silkworm gut was removed in three weeks and passive motion begun. She made a perfect recovery of motion, with bony union.

Conclusions: In wide separations of fragments, where there is no constitutional or other contraindication, this open operation appeals to me, because—

- I. It secures accurate reduction and fixation.
- II. It allows removal of blood and clots from between the bone fragments and from the joint, thus favoring union of bone and lessening chances of joint adhesions.
- III. It does not further mutilate the broken bone

by drilling, which interferes with its nutrition, and it leaves no foreign body to give possible trouble.

#### FRACTURES INVOLVING JOINTS.

Healthy joints may be held at rest for months with no injurious effects. Hence, when there is a fracture in a long bone with no injury to a joint, the extremity may be encased in a permanent splint and left there until union is firm, and the joint remains in a normal condition. Joints that are diseased, or those in persons over sixty, should be allowed some motion or change of position, or they will become stiff. Personally, I rarely use a plaster of Paris or any other permanent dressing, because I believe that even if the joints do not suffer by an enforced rest the muscles do, and the return of the injured member to usefulness is delayed.

When, however, the fracture is into or near enough to a joint to cause the exudation to appear in and about the joint, to keep such a joint at rest gives the exudate every opportunity to become organized and to form adhesions. Hence, only such splints should be applied as can be easily removed, or such as will allow the use of massage.

The passive motion of the muscles and tendons will not only be a great factor in preventing adhesions, but will hasten the healing process. Great care should be observed in such manipulations. The fragments must not be disturbed, and the inflammation must not be increased. How soon after the injury should massage be used is a question which must be answered by the condition of the individual case. Stimson gives this rule: "So long as the joint is swollen and hot, so long as its use is followed by increase of swelling and heat and by persistent pain, so long must it be kept at rest." This rule applies to both active and passive motion. Still, by using the very gentlest massage, and that for a very short time, a beginning may be made very early—in some instances as soon as the day after the injury. Never to cause pain and to be sure that on the following day there is no increase of swelling, are two warnings which, if carefully obeyed, will prevent any harm resulting from the manipulations. Scudder says: "Passive motion that is painful does harm."

Massage and passive motion are simply means for producing hyperemia which may be produced by many other methods, such as electricity, superheated air and Bier's hyperemia. Some of these are better and much easier of application than massage and passive motion, when one has the necessary apparatus, and they are for these reasons much more available for use in fractures that for one reason or another cannot be released from splints.—LUCRETIVS H. ROSS, *Transactions of the N. Y. and N. E. Assoc. of Ry. Surgeons*.



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**WALTER M. BRICKNER, M.D., Editor**

NEW YORK, JANUARY, 1914.

## **FRACTURES.**

So much attention is being devoted to improving our methods of reducing fractures, so many mechanical devices are being proposed, and so much discussion is taking place concerning the relative advantages of these devices and the indications for radical procedures, that special interest will, we are sure, attach to this issue of the JOURNAL, containing, as it does, so many excellent articles, written by competent and experienced observers, and dealing with various phases of the operative and non-operative treatment of fractures, in general, and certain fractures, in particular. A review and bibliography of recent fracture literature will also be found on page 52.

The treatment of fractures is probably as old as man himself, and for at least as long a time as we have satisfactory records it has not varied in the principles involved: 1st, reduction of the fragments; 2d, immobilization (retention of the reduction) for a greater or less period, and 3d, the prevention of disability. Attention to the third principle has considerably altered the practice of the second; and efforts more thoroughly to apply the first have introduced new methods of traction, and the exposure of the fragments to vision and direct manipulation.

But whatever the mode by which these principles are applied the union of the bone, like the healing of other tissues, must be left to Nature. Artificial means may encourage or stimulate that healing; but also they may retard it. And this, in our opinion, is one of the ob-

jections to certain types of open operation, as pointed out by Magruder and by us elsewhere in this issue.

The greatest of all the contributions to the management of fractures is, of course, the x-ray; and it would be platitudinous to repeat here the various reasons why radiography should be invoked as a routine in the treatment of fractures and in the diagnosis of all those conditions in which, by reason of direct or indirect violence, a fracture may be present.

Curiously enough, in spite of all we have learned from the innumerable radiographs that have been made in nearly two decades, they have discovered, as far as we can now recall, no hitherto unknown variety of fracture—except that of the base of the fifth metatarsal from indirect violence, described some few years ago by Robert Jones.

Radiography has emphasized what, to be sure, was known before, viz., that perfect reduction is not essential to good function. Equally important is its teaching that perfect reduction is rarely accomplished even by open treatment. Nevertheless, not a few surgeons, perhaps in an effort to approach perfection, have advised the more or less routine operative management of a wide variety of fractures. Most surgeons, however, have more wisely recognized as the legitimate field for radical measures those cases only in which, without them, function is, or threatens to be, impaired. This attitude is gaining in acceptance, as the reports of the British and American Fracture Commissions indicate, and the articles in this issue of the JOURNAL demonstrate.

The operative treatment of fractures is not new; it has been a familiar practice on the patella, the olecranon and at other sites. It has grown, however, with improvements in technic, the invention of bone levering and holding instruments, and the addition to suturing, wiring and nailing of other, more rigid fixation devices.

It is in fracture of the adult femur shaft that radical treatment has its least-disputed claims to superiority. Here the contraction of large muscle masses usually produces an amount of overriding, and corresponding shortening of the extremity, that manual traction, however vigorous, will not overcome. The adhesive-plaster-and-bandage traction of the now old-fashioned Buck's extension apparatus is also usually quite unsatisfactory. Even if the excellent traction apparatus of Lemon or the powerful one of Lambotte reduces the overriding in a single sitting the plaster cast may fail to maintain the reduction. Hence there developed, in Europe, efforts to apply, more directly, continuous traction or distraction by the "closed," "semi-operative," and "open" methods that have been associated with the names of Codivilla, Steinmann, Lambret, Hackenbruch, Bradenheuer.

The immediate fixation of the deliberately exposed fractured ends is by no means new in surgery. The older, and still often and success-

fully applied, methods were by wire (and other sutures), screws, nails and occasionally bands. These have the drawbacks, however, that they not only often fail to hold the bones but also that, producing rarefaction at the fracture lines, they may cause non-union. Arbuthnot Lane sought to overcome these objections by developing the occasionally and unsatisfactorily used metal strip into a long and strong plate, by fastening it to the bone with comparatively short, full-threaded screws placed at some little distance from the fracture line, and by establishing reliable technics of asepsis and manipulation. The Lane plate and Sherman's vanadium steel plate and special screws have secured some excellent results in the hands of their authors and of many other surgeons.

In the opinion of most competent observers, with which Lane disagrees, bone plating delays the period of healing. This objection, while of economic import, would not in itself be very serious, if there were no others.

Animal tissues are intolerant of foreign bodies. That in many cases bone plates have been borne in entire comfort for long periods (perhaps indefinitely) does not disprove the rule. In a very large percentage of cases, the figures varying with different surgeons, the plates have sooner or later given trouble and had to be removed. To secure the immediate mechanical advantages of the plate and avoid the necessity for removal by a second operation, there have been evolved "external plates" and clamps, of which those of Lambotte and Parkhill are prominent examples. These, too, have proven useful but they possess the objections inherent to the insertion of bone screws and the possible dangers of infecting the bone through open wounds.

The frequent necessity of removing them might also be excused in the mechanical advantages of the Lane plates, if there were not still other objections. In addition to such accidents as refracture through a screw hole, suppuration with resultant osteomyelitis or sepsis, etc., (which may be largely attributable to faulty technic), the mere presence, in and on the bone, of the metallic screws and plate may, we believe, not only retard but actually prevent bone healing.

To replace the metal plate or clamp with a non-irritating and physiologically acceptable substitute is a great desideratum. To the extent of its limited strength, the autoplasmic bone splint-graft is the ideal substitute, for it not only does not inhibit but actually stimulates healing. It has been used in two ways: as a cortical graft, mortised into the shaft (Albee); and as an intramedullary splint (Murphy), in the same manner as the now discarded intramedullary splints of metal and ivory.

In cases of non-union without displacement, the employment, as described by us on page 16, of an autoplasmic bone graft, not as a splint but merely as a stimulant of osteogenesis, seems to us quite rational.

That the open treatment of fractures should not be undertaken by those who have not the experience, the tools, the competent assistance, and the rigidly aseptic environment that are essential to success, need not be interpreted to the discouragement of the ambitious and capable man who has the opportunities but not the training; for if he is willing to make the effort to secure the one he may put himself in the position to enjoy the other. Excluding, of course, the emergencies of depressed skull- and compound fractures, the open operation is never urgent. The patient can only benefit by such delay as may be needed to provide him with the proper environment of surgeons, tools, and technic.

After all, the radical methods are only a small and special part of the vast amount of fracture work that falls to the duties of surgeons and general practitioners. And the increasing literature of that small and special part should not belittle the dignity nor obscure the importance of the larger part. The management of the "everyday fractures" is a serious, delicate task that involves experience, diagnostic sense, conscientiousness, mechanical dexterity, and painstaking attention, both during and after healing, to prevent deformity and to avoid functional disability. It is one of the finest of the surgeon's arts, more difficult and more exacting than much that is glorified as abdominal surgery.—W. M. B.

## Surgical Suggestions

Fracture by slight or indirect violence suggests the possibility of some disease of the bone; so does non-union.

The absence of displacement in a fracture of the olecranon gives no promise of immunity from impaired function; callus formation may interfere with the joint action.

Subperiosteal fracture of the patella is an occasional cause of persistent pain and stiffness in the knee. It is one of the various things that may be discovered upon radiographic examination in cases of obscure joint disability.

If a cursory examination of a radiograph shows no fracture, in a case where clinical signs indicate its presence, look carefully within the bone shadow for the evidence of a fissuring or subperiosteal break.

Ultra-rigid asepsis and minimization of manipulation are the first great essentials in the open treatment of fractures. If these cannot be provided by the environment of the surgeon and by his experience, don't operate.

## Surgical Sociology

Ira S. Wile, M. D., Department Editor.

### FRACTURES AND SOCIAL LOSS.

A new Workmen's Compensation Act has recently been passed by the New York State Legislature. The purpose of such an act is to provide a reasonable compensation to a workman or his family for the consequences of an industrial accident. Such accidents have been regarded as part of the cost of the product which should be shifted upon the community instead of permitting workmen to bear the expense and be subjected to undesirable forms of charity.

Among industrial accidents, fractures assume a prominent place. The cost of fractures regarded as a temporary disability is reflected in the expense necessary for the maintenance of ambulance services, surgical dispensaries, and hospitals. This does not take into account the possible loss of family independence resulting from the incurring of debts in order to take care of the patient, nor the wage loss resulting from the disability. The permanent effects of fractures with stiffness, shortening, or non-union, may result in the necessity of changing an occupation to one less remunerative or for which the sufferer is not specially adapted.

The larger questions of invalidity insurance and unemployment immediately arise to consciousness in contemplating permanent disabilities. The loss of the service of a vigorous male adult, owing to a permanent disability resultant from a fracture, may involve forcing the wife into industry or perchance deprive children of their rights in education and hasten them into occupations for which they received no preparation. There is a distinct wage loss and a loss in industrial efficiency, together with a complete lowering of family standards of living for which the community must pay directly or indirectly.

From the standpoint of litigation, it must be borne in mind that one-third to one-half the time of our courts is now spent in the trial of accident cases, wherein damages are sought.

In order to protect the community from these suggested anti-social results, it is necessary to lessen the frequency of accidents that cripple or destroy. The frequency of fractures among industrial accidents is sufficiently important to warrant particular attention to their prevalence and to the nature of the disability that results.

The experience of Austria for the years 1897 to 1901 indicates the following frequency of fractures and the nature of the disability.

Fractures	Disability		
	Temporary per cent.	Permanent per cent.	Death per cent.
Left arm .....	43.4	56.6	
Right arm .....	46.8	53.2	
Left forearm .....	49.8	50.	.2
Right forearm .....	50.9	48.7	.4

Bone, left hand .....	54.9	45.1	
Bone, right hand .....	58.8	41.2	
Thigh .....	17.8	79.7	2.5
Leg .....	40.	59.	1.
Collar bone, also injury of arms .....	49.7	50.2	.1
Ribs .....	57.	32.5	10.5

In the experience of Germany from 1904 to 1908, the injuries which required special treatment for 13 weeks of disability, presented these interesting figures for the fractures of bones:

1904.....	2,451	out of	10,989	accidents
1905.....	2,565	"	11,250	"
1906.....	2,627	"	11,034	"
1907.....	2,811	"	11,371	"
1908.....	3,275	"	12,569	"

The statistics of Great Britain for 1904 to 1908, listing the fractures occurring in workshops, indicate that the fractures of the limbs or bones of the trunks were 3,682 and fractures of the hand or of the foot were 3,091 out of a total of 143,097 total accidents.

Norway compensated during the years 1895 to 1899 for 1,448 fractured limbs out of a total of 9,320 accidents.

The prevalence of fractures among the non-fatal injuries which occurred to railroad employees in the State of New Jersey for the years 1888 to 1907 bears witness to the variation in liability to fractures according to the occupation of the workmen. The percentages of fractures among the injuries sustained among the different employees were as follows:

Laborers .....	11.0	Flagmen .....	8.7
Station men .....	9.1	Baggagemen .....	15.
Freight conductors ..	8.3	Car repairers .....	6.4
Yard conductors .....	6.1	Roundhouse men ....	4.9
Conductors .....	5.9	Car examiners .....	5.6
Engine men .....	4.5	Car cleaners .....	6.6
Firemen .....	4.6	Freight handlers ....	8.1
Freight brakemen ..	4.1	Section hands .....	11.
Switchmen .....	6.8	Carpenters .....	8.9
Signal men .....	17.		

As further evidence of the frequency of occurrence of fractures in industry the figures of New York State for the years 1901 to 1906 indicate that fractures, producing temporary disability, formed 5.8% of all accidents.

Statistics might be adduced at greater length to accentuate the serious economic loss that results from the high accident rate, particularly insofar as fractures of the extremities are concerned. It is obvious, however, that fractures form but one phase of the industrial accident problem. The fact that fractures are not generally attended with mortality does not mitigate the economic, industrial, and social loss that they occasion. The problems of preventing fractures are merely those involved in the prevention of accidents in general. The maintenance of industrial efficiency demands the conservation of the workers. This does not mean merely the protection of the life of the workmen but the protection of their physical powers and the maintenance of their vigor, health and physical capabilities. To reduce the number of cases of fractures occurring in the industrial world would mean a step in the reduction of all in-

dustrial accidents. A fracture means not merely a break of a bone, but a break in the continuity of personal power, a break in industrial efficiency, a break, though small, in social development.

## Book Reviews

**A Manual of X-Ray Technic.** By ARTHUR C. CHRISTIE, Captain, Medical Corps, U. S. Army, Instructor in Radiology and Operative Surgery, Army Medical School, Washington, D. C. With 42 illustrations. Philadelphia and London: J. B. LIPPINCOTT COMPANY. Price \$2.00.

This is an elementary manual on the subject, especially prepared with a view to the needs of the medical service of the United States Army. For those who know little or nothing of the management of X-ray apparatus this is a good book with which to begin to learn; for the various parts are very clearly, concisely, and simply described.

**Minor and Operative Surgery and Bandaging.** By HENRY R. WHARTON, M.D., Surgeon to the Presbyterian and the Children's Hospital; Consulting Surgeon to St. Christopher's Hospital, etc., etc., Philadelphia. Eighth edition, enlarged and thoroughly revised. Small octavo; 570 illustrations. Philadelphia and New York: LEA AND FEBIGER, 1913.

Wharton's book is so well known that an extensive review of its many valuable qualities in its present form, the eighth edition, is unnecessary. The general arrangement is the same as that of the previous edition. A careful revision has been made, much obsolete material omitted, and considerable new matter and many new illustrations added. We continue to fail to see the purpose of including operations on the esophagus, stomach, intestines, kidneys, etc., in a work on minor surgery.

**Year Book of the Pilcher Hospital.** For the period from April 1, 1912, to March 31, 1913. Being the third year of the operation of the hospital. Brooklyn, N. Y. Published by the Drs. PILCHER.

In their introductory remarks the surgeons of the hospital state that there has been a steady increase in the demands upon the resources of the institution, indicating that its foundation was based upon a real need. Altogether 220 operations were performed, of which the majority were abdominal. It is perhaps correct to state that the most valuable of the contributions from the Pilcher Hospital is based upon studies of one of the conditions encountered 12 times at abdominal operations—membranous colitis. Very gratifying results have been attained by the Beer method of treatment of vesical papillomata. Many cases of general surgical interest are reported by the surgeons of the Hospital.

**Pyorrhea Alveolaris.** By FRIEDRICH HECKER, B.Sc., D.D.S., A.M., M.D., Member of the Academy of Science of St. Louis, Mo.; Consultant at Bell Memorial Hospital of the School of Medicine, University of Kansas; Consultant at St. Margaret's Hospital, Kansas City. Illustrated. St. Louis: C. V. MOSBY COMPANY, 1913. Price \$2.00, cloth binding.

The subject of pyorrhea alveolaris is no longer one of interest to dentists alone, but is of almost equal concern for the nose and throat specialist, the otologist, the ophthalmologist, and the internist. This is the first book that has come to our notice that treats the subject in an intelligent and concise fashion. In 157 pages the pathology and bacteriology, the clinical varieties, the treatment (and especially the vaccine treatment)

are methodically taken up in a scientific manner. That the author is deeply interested in his subject is shown by his demonstration of the artificial production of pyorrhea alveolaris in a guinea-pig—the first experimental demonstration of the disease.

Contrary to the belief generally held among dentists that pyorrhea is a local affection, Hecker maintains that it generally depends upon constitutional disease. The book is built about this thought, and wisely built, we believe. In print, style, illustrations, and binding it is attractively prepared for the reader.

**Vicious Circles in Disease.** By JAMIESON B. HURRY, M.A., M.D. (Cantab.), ex-President Reading Pathological Society. Second and enlarged edition. Philadelphia: P. BLAKISTON'S, SON & CO., 1913. Price \$3.00 net.

As the author states in the preface to the new edition of his work, the monograph represents the first attempt to deal systematically with vicious circles in disease. He has exerted himself to supply independent testimony for all the propositions advanced. Six new chapters have been added in order to cover the ground more thoroughly. The new edition, uniquely prepared for the physician by the publisher, will undoubtedly be even more widely read than the first.

**Vaccine and Serum Therapy.** Including also a Study of Infections, Theories of Immunity, Specific Diagnosis and Chemotherapy. By EDWIN HENRY SCHORER, B.S., M.D., DR.P.H. Second edition. Octavo; 300 pages. St. Louis: C. V. MOSBY COMPANY, 1913.

A comparison of this edition with the first, published four years ago, shows that the work has been practically rewritten. The scope of the text has been considerably amplified. While the first edition was devoted to the theory and practice of vaccine therapy, and a short chapter on serum therapy, the present edition includes also specific diagnosis. In this chapter the theoretical basis and practice of the Wassermann reaction, the cobra-venom, butyric acid, ammonium sulphate and albumen tests are described. In the section on inclusion bodies, no mention is made of the value of the finding of such bodies in the blood of scarlet fever patients. The chapter on specific therapy has been amplified and includes a discussion of certain diseases that were omitted in the first edition. A chapter has been added on chemotherapy, and an appendix on the diagnosis, treatment and prophylaxis of syphilis and malaria.

While not intended to be exhaustive, the book affords an excellent practical guide to the subjects of which it treats. In this edition the value of the text has been enhanced by the addition of references to the literature. The book is marred by slipshod English and worse punctuation; also by careless printing of proper names. The index is not entirely satisfactory; for instance, the luetin reaction of Noguchi is mentioned in the text but is absent in the index.

**Epidemic Cerebrospinal Meningitis.** By ABRAHAM SOPHIAN, M.D., formerly with New York Research Laboratory. Octavo; 272 pages; 23 illustrations. St. Louis: C. V. MOSBY COMPANY, 1913.

The author is remembered by his brilliant work in the widespread Texas epidemic of cerebrospinal meningitis in 1912. It is given to few to be accorded such a splendid opportunity to study a disease, but it is rarer still to find such opportunities as thoroughly grasped, as the text of this work indicates. The book is a monograph of a high order and should prove the authoritative work on cerebrospinal meningitis for many years. Every phase of the disease is given consideration; etiology, symptomatology, bacteriology, laboratory diagnosis, complications, studies of blood pressure and treatment. The chapter on the administration of, and the results obtained by, the Flexner serum is worthy of the closest study. The author's method of dosage, in accordance with the blood pressure, is described fully and is an important contribution to the therapy of cerebrospinal meningitis. The text is clear, direct and concise, and the presentation orderly.

# Progress in Surgery

## A Résumé of Recent Literature.

### RECENT FRACTURE LITERATURE.

#### GENERAL PAPERS.

About a year ago there appeared two excellent commission reports on the treatment of fractures, one in England and one in America. The report of the Committee of the British Medical Association (*British Medical Journal*, November 30, 1912) regarding the treatment of fractures, is supplemented by an excellent article from the pen of ROBERT JONES of Liverpool dealing with the same subject (*British Medical Journal*, December 7, 1912). "The Report of the Commission on End-Results of Fractures of the Femur," by W. L. ESTES, in the *Pennsylvania Medical Journal*, December, 1912, while of narrower scope, may be applied to treatment of fractures elsewhere.

The gist of the conclusions indicates that the non-operative measures for treating fractures which are already at our command, have, in general, not been utilized to anything like their full possibilities. Only after these have all been exhausted, should operative treatment be considered.

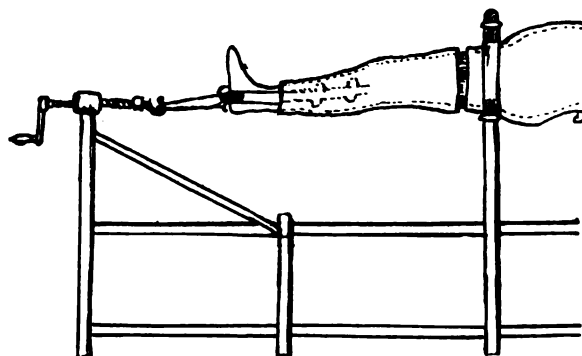


Fig. 1. Codivilla's plaster cast and nail extension method.

Taken together, these three papers constitute a most concise collection of valuable information concerning the non-operative treatment of fractures in general.

#### THE REDUCTION OF FRACTURES UNDER LOCAL ANESTHESIA.

This is not a new subject. The procedure was first employed by Conway, an American, more than twenty-five years ago. Local anesthesia is employed more extensively in Europe than here. For example, this type of anesthesia is used in 60 per cent of all operations at Wilms' clinic in Heidelberg. In the treatment of fractures as well as in general surgery, the tendency is to use local anesthesia wherever possible. BRAUN, in Germany (*Deutsche Med. Woch.*), 1913, p. 17, and QUENU, in France, both use a long thin needle through which they inject a suitable quantity of local anesthesia around each end of the broken bone.\*

DOLLINGER of Buda-Pesth (*Zentralblatt f. die Gesamte Chir. u. ihre Grenzgeb.*, 1913, Band 1, page 175) describes reduction of fracture of both bones of the leg under local anesthesia with the aid of the fluoroscope. In his clinic the anesthetic is injected either around each end of the broken bone or a circular anesthesia is established by infiltrating the limb at a suitable level proximal to the site of fracture (*Zentralblatt f. Chirurgie*, 1913, page 763). A most accurate method for blocking the brachial plexus was devised by KULENKAMPFF in 1912 (*Zentralblatt f. Chirurgie*, 1911, page 1337). The needle is introduced just above the clavicle. (For details of technique see account in original article.)

In Germany this method has gained wide acceptance. In G. Hirschel's book on local anesthesia (published by Bergmann, Wiesbaden, 1913). Kulenkampff's method is

given the preference in fractures and dislocations of the upper extremity, while, on account of the less perfectly developed method of anesthetizing the lower extremities by blocking of the nerves, the application of local anesthesia to the end of the broken bone is advocated, especially in Pott's fracture.

#### EXTENSION METHODS.

These are chiefly important in treating fractures of the lower extremities, especially fractures of the femur. In



Fig. 2. Steinmann's nail extension.

skilful hands, excellent results may be obtained with the time-honored Buck's extension, Hodgen's suspension splint or Sayre's double oblique splint. In all of them, the bandages loosen, consequently one must be willing to devote plenty of time and consideration to their daily readjustment.

The muscles of a limb enjoy maximal relaxation when that limb is in the position of *semiflexion*. This principle was known to, and was mentioned by, Sir Astley Cooper. Probably every authority on fractures, before and since

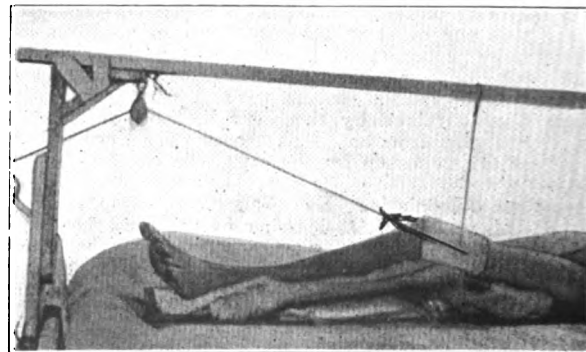


Fig. 3. Steinmann's nail extension applied.

his time, has known it also. Since its rediscovery by ZÜPPINGER in Germany a few years ago, semiflexion is the position in which traction is applied to fractured limbs in most of the clinics in that country. The acme of the adhesive plaster extension method has been reached by the

\*This method is also described in Braun's book, third edition, published by Barth, in Leipzig, 1913.

school of BARDENHEUER, of Cologne. As an example of their excellent results, OTTO GRUNE (*Deutsche Zeitschr. f. Chir.*, 1913, page 81) of Bardenheuer's clinic, cites a series of forty-one fractures of the neck of the femur treated by this method. In only three of the cases was there shortening from one-half to one centimeter. The technique is difficult for the average man to acquire. Even for an expert it requires a great deal of painstaking care and frequent control by the *x*-rays. These reasons explain why this method has never found extensive adoption even in Germany.

#### Distraction and Nail Extension Methods.

In 1903 CODIVILLA's first articles appeared. A plaster cast encased the fractured limb from the toes to the pelvis. The day after its application, either with or without

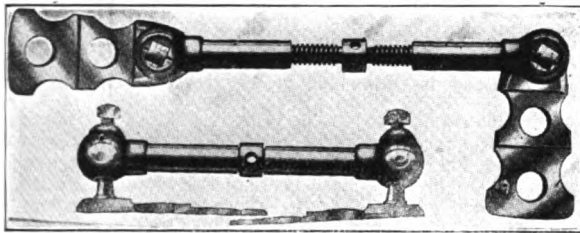


Fig. 4a. Hackenbruch's distraction clamps with universal joints at junctions of turnbuckles and plates.

a general anesthetic, a circular division of the cast was made about the middle of the thigh. Under strong traction, the two pieces of the cast were separated and the gap between them was filled with fresh plaster, traction being maintained until the plaster had firmly set. This procedure was repeated when necessary.

In some of the cases there was decubitus formation over the skin of the tuber ischii, over the dorsum of the foot, and over the heel. To avoid this, Codivilla left the foot and ankle free and incorporated two lateral iron straps in the plaster cast. Their free ends extended down to either side of the ankle. The free ends of a nail transfixing the calcaneus engaged holes in the lower ends of these straps, and this, together with a little more padding over the tuber ischii, prevented further decubitus formation (Fig. 1). The greatest lengthening obtainable by this method is 6 m. Lateral pressure of the nail occasionally cut through the cancellous calcaneus.

In 1907 STEINMANN, discarding the plaster cast, retained the nail and transfixed the lower fragment of the frac-

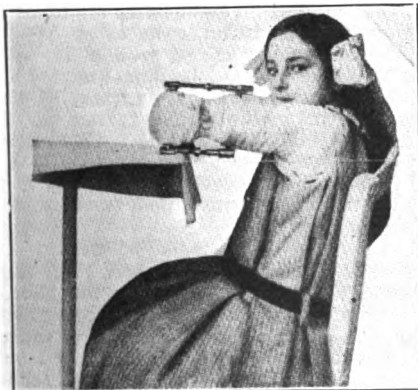


Fig. 4b. Hackenbruch's clamps applied to humerus fracture.

tured bone at a point well away from the fracture and its hematoma. Placing the limb in semiflexion, he attached his traction to the projecting ends of the nail (Figs. 2 and 3). With his method he has been able to overcome shortenings of eleven centimeters.

In 1901, KÄFER of von Eiselsberg's clinic, conceived the idea of applying a plaster cast to a limb, dividing it circularly the next day, after it had set, and, placing a turn-

buckle on either side of the leg at the point of division, in such a way that the end plates each came in contact with the cast, one above and one below the line of section. They were then incorporated in the respective halves of the cast by the application of more plaster. When everything had firmly set, it was easy enough to distract the halves of the casts by rotating the turnbuckle's barrel.

By this *gradual* means far greater distraction could be obtained, than by the sudden retraction of Codivilla. If tension was irksome to the patient it could be decreased



Fig. 5. Lambret's distraction method for fracture of leg.

at any time. While this method readily overcame shortening, it did not correct lateral or rotary displacement.

HACKENBRUCH improved upon this, putting a ball and socket joint (Fig. 4) at either end of the turnbuckle where it joined the plate. By judicious distraction the shortening in a fracture of both bones of the leg can be overcome in about forty-eight hours. The four ball and socket joints are now cautiously loosened, the necessary correction to overcome lateral displacement is made, and the joints are tightened once more to hold the leg in its new position. The efforts at correction are controlled by the *x*-ray. When the correct position is obtained, the patient is allowed to walk.

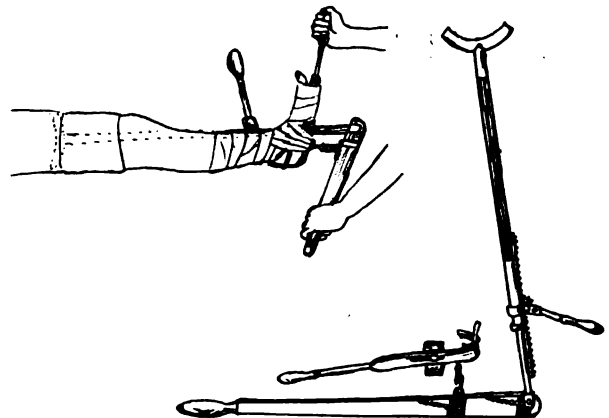


Fig. 6. Lambotte's traction apparatus: perineal crutch, lever and foot plate.

The accompanying figures show the Hackenbruch distraction clamps (Fig. 4, a and b) and illustrates its application. (*Zeitsch. f. Artzl. Fortbild*, 1913, page 28; *Zentralbl. f. Chir.*, 1913, page 605; *Deutsch. Zeitschr. f. Chir.*, Band 122, page 464.)

PATTERSON's method (*American Journal of Orthopedic Surgery*, 1913, page 649) is practically the same as that of Hackenbruch.

#### Ambulant Treatment with Extensions.

In fractures of both bones of the leg, TÖBBEN (*Zentralbl. f. Chir.*, 1913, page 996) employs the following apparatus. A firm, felt ankle with eyelets at its lower margin fits snugly over the ankle securing both malleoli. It is cut behind to avoid pressure over the achilles tendon. A plaster cast is applied to the leg from the knee to within



two inches of the ankle. Incorporated in it are the vertical bars of a strap-iron stirrup which extends well below the heel, while one inch proximal to the cross bar of the stirrup is a second cross bar. At its center is a thumb screw. Strong laces from the eyelet holes of the felt ankle all lead to this thumb screw, the tightening of which consequently makes traction. PATEL's article\* describes a similar method lately invented by JABOULAY where traction is made upon a shoe plate instead of a felt ankle. G. GIAQUINTA (*Gaz. degli osp. e delle chir.*, 1913, p. 13) also advocates ambulant treatment with extension.

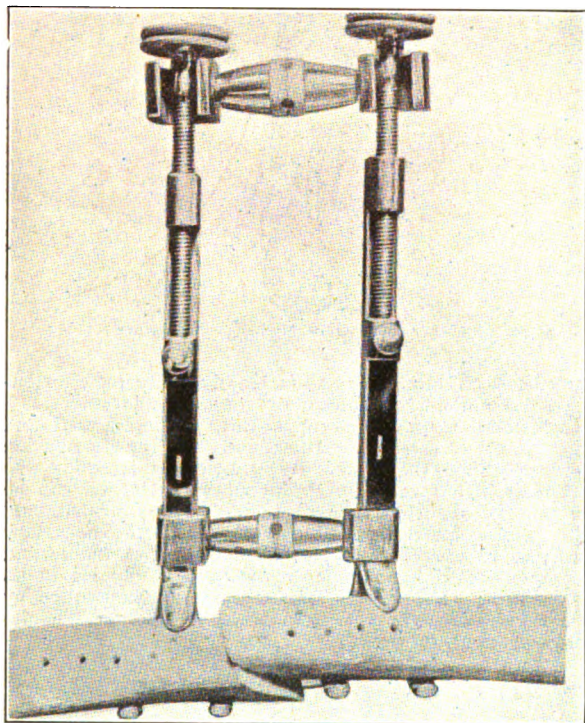


Fig. 7. Gerster's turnbuckles applied to Lowman's bone clamps, reducing fracture of femur.

To return to Steinmann's Nail Extension method (*Neue Deutsche Chirurgie*, Band 1, 1912, *British Medical Journal*, November 30, 1912, page 1235; J. C. A. GERSTER, *American Journal of the Medical Sciences*, August, 1913, page 157), space does not permit a detailed description of it here; but the advantages it possesses over other traction methods deserve mention.

In the first place one need not be in a hurry to apply it. There is no disadvantage in waiting for intercurrent diseases such as delirium tremens or pneumonia to run their course, or for abrasions and contusions of the broken limb to heal before application of the nail extension. Once properly applied, very little time need be spent in the daily inspection and care of the case. Massage of the thigh and passive motion of the knee joint may be begun as early as the fifth day after extension. There is little if any pain, and there is no decubitus. The danger of infection is extremely small if the rules laid down by Steinmann are followed. Nail extension as an aid to operative treatment will be referred to later.

LAMBRET in fractures of both bones of the leg transfixes the upper and lower fragments with nails placed well away from the site of fracture. Distraction is effected by turnbuckles which engage the ends of the nails (Fig. 5). The Lambret and Steinmann method have been combined. Nail extension is a comparatively new thing in America. Modifications and improvements naturally suggest themselves to the reader's mind. Before claiming priority for such ideas, it would be well to peruse the original monograph of Steinmann which contains a num-

ber of such improvements and the reasons for their being discarded.

#### OPERATIVE TREATMENT.

Because of the effective traction afforded us by nail extension, the operative indications for treating recent fractures have narrowed down to the cases with interposition of soft parts in fractures of the shafts of long bones, and irreducible displacements in fractures around the joints. The object of operation is to secure accurate anatomical reposition of the fracture.

LAMBOTTE's book on the Operative Treatment of Fractures is the most important communication on this subject of the year 1913. (*Lambotte, Chirurgie Operat. des Fractures*, Masson, Paris, 1913.) He is not wedded to one method, but adopts the various means at his command to suit the individual case. Important points in his technique will be referred to below.

*Asepsis.* Infections coming on after clean bone operations are absolute indications that the clinic in which they have occurred is imperfect in its aseptic technique, not-

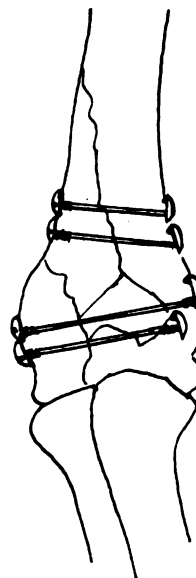


Fig. 8. Lambotte's bolts applied to comminuted fracture.

withstanding what may be said to the contrary. As a rule, the fault lies neither in the preparation of the patient nor in the preparatory disinfection of the surgeon and his attendants. It is failure to avoid infection, once the operation is begun, which constitutes the cause of non-success. For example, visitors may crowd around the operator and his assistants whose elbows become infected by contact with the clothes of the spectators; an arm whose elbow is infected, reaches across the wound for an instrument and brushes either the other instruments upon the table or the dorsum of the other hands at the wound. This is merely an example of one of the commonest breaks in technique. A long article might be written upon this subject.

#### Freeing of Fragments.

In the *Annals of Surgery*, October, 1912, the reviewer described how, after cutting down to the bone, the limb could be flexed at the site of fracture, and retractors could be inserted into either fragment, to draw them apart as they were gradually freed by small repeated cuts against the bone. In this way in fractures of the femur, the attachments of the linea aspera are freed from either fragment for an inch or two. This method saves much time and facilitates the control of hemorrhage.

Once these are freed, the reduction of fragments may be accomplished in one or several ways. (1) In the well-known LEMON-MUELLER apparatus the pelvis is fixed and traction is made upon the foot.

(2) Lambotte has a far simpler method: A perineal crutch with a lever and foot plate (Fig. 6).

(3) McGLANNAN of Baltimore (*Surg. Gyn. & Obst.*, Vol. 16, 1913, p. 429) uses the Steinmann nail method for traction.

\*Patel, *Progre. Med.*, 1913, p. 286.



(4) Turnbuckles for distracting the overlapping fragments of fractures of the long bones were described by GERSTER, in the *Annals of Surgery*, November, 1912, and by G. H. COLT of Aberdeen in the same journal, October, 1913.

The methods described in these two articles are essentially the same in principle; each requires an assistant. However, an improvement upon these, described by Gerster in the *Annals of Surgery*, November, 1913 (Fig. 7), eliminates the necessity of depending upon anyone for assistance in operating.

**Retention Apparatus.** Small cigar box nails are excellent for holding together the small comminuted fragments of fractures around the elbow joint. Intercondylar fractures are held in place by Lambotte by long, narrow bolts binding the fragments together (Fig. 8). Trochanters which have been torn loose may be nailed or screwed into place. In fractures of the neck of the femur, long, large nails transfix the great trochanter, femoral neck, and head, holding the fragments in their proper relation (F. König, 1875).

In fractures of the shafts of long bones, plates are more frequently used than either wire loops or bands.<sup>1,2</sup> The tough elastic Vanadium steel plates of SHERMAN and his self-tapping, machine-threaded screws (Fig. 9) are a vast improvement over the old brittle plates and still more brittle wood screws which at first were used. The reviewer has never seen one of these Sherman screws break. The strongest plate so far devised has been recently published by SOUTTAR, *Annals of Surgery*, November, 1913, page 653. It is L-shaped on cross section and is devised for transverse fractures only. A slot is cut into the bone by a special saw, and into this, one-half of the L fits. Both band and screws hold it in place.

In oblique fractures of the femur, among others, MILNE of London uses steel bands to hold the fragments in place. It does not seem possible to tighten wire loops as effectively as such bands, and for this reason and because it acts through wire, has not been used very extensively.

Ivory pegs, plates, and screws have been used both here and abroad. They have not found widespread adoption. They possess the advantage of being absorbable and the disadvantage of being weak.



Fig. 9. Sherman's vanadium steel bone plates and self-tapping screw.

The intramedullary bone splint is rarely used in recent fractures, but is often employed in cases of non-union. The intramedullary metal splint, usually of aluminum (ELSBERG), has fallen into disuse.

The external bone clamp of PARKHILL of America, and of LAMBOTTE of Belgium, are practically the same instrument. LEONARD FREEMAN of Denver still advocates its use, but Lambotte, we hear, has given it up. It is a well-known principle that the larger the object implanted into the bone, the longer it holds firmly. In *badly infected compound fractures* the small screws of the LANE plate work loose in two or three weeks at the longest, while the Lambotte clamp holds firmly for eight weeks or more. A fenestrated plaster cast and the Lambotte external clamp immobilize the fragments at the same time that they permit easy access to the wound. This combination is the most satisfactory fixation method for badly infected fractures we possess at present (Fig. 10).

#### The Operative Treatment of Mal-Union with Marked Over-riding.

In some cases it is possible to pull down the bone end-to-end at the time of operation so as to apply a suitable

<sup>1</sup> Willard Bartlett, *Cleveland Med. Jour.*, 1913, Vol. 12, p. 465; *Boston M. & S. Jour.*, 1913, p. 149, reports 76 platings.

<sup>2</sup> John B. Walker, *Boston Med. & Surg. Jour.*, 1913, p. 60; *N. Y. State Jour. of Med.*, 1913, p. 64, reports 21 platings.

<sup>3</sup> Troell (Nord. Med. Ark. Kirurg., 1913, pp. 1-45, Vol. 46) reports his experience with operative treatment of fractures, operates in 5% of all fractures.

<sup>4</sup> Lane, *Murphy, Surg. Clinics*, Vol. II, No. 1. Feb., 1913.

internal splint. When this was not possible, it has been customary to resect enough of the bone ends to bring the fragments end-to-end; shortening naturally resulted. Steinmann does not resect the end of the bone, but, instead, closes the wound, leaving the fragments overlapping, applies nail extension and overcomes the shortening within a week or two. Of course more weight is needed here than in the case of recent fractures.

WALTHER (*Bull. et mem. de la Soc. Chir. de Paris*, 1913, p. 428) reports a malunion of both bones of the leg successfully treated by the method of Lambret.

#### Delayed Union.\*

It has been customary in this country after plating a bone to apply a plaster cast to the limb and to keep the patient quiet until union has taken place. In a considerable number of instances there has been delayed union, although in none of them was there the slightest infection. Naturally the long immobilization of the knee joint resulted in its practical ankylosis.

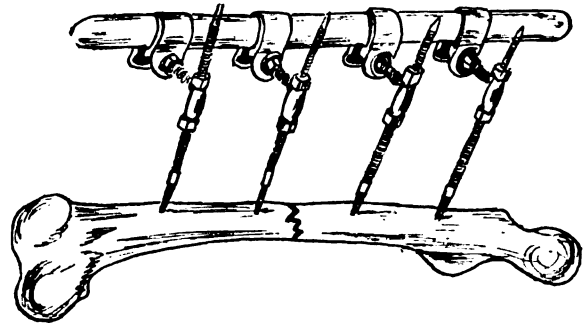


Fig. 10. Lambotte's external bone clamp

It seems quite possible that the immobilization immediately following the operation largely accounts for these delayed unions, and that the union in most cases comes, thanks to the patient's constitution, in spite of the surgeon's removal of much callus at operation and subsequent immobilization.

It seems as though the frequent infections and the loosening of the screws when Lane plating was first tried here, led to the idea that the presence of a plate tended to "irritate" the tissues and thus predisposed to infection. Consequently a wild goose chase for less irritating fixation material was begun and is still going on. Perhaps the trouble was that our plates and screws at first were not made of strong enough material. And secondly, that now we use too small plates and too few screws. Many of those who were present at the last Clinical Congress at Chicago were surprised to see the size of the plates Lane used in one of his operations for a fractured femur and were still more surprised to note that he did not apply a plaster cast after having dressed the wound.

In reply to questions about this point, Lane stated that he had too much respect for the patient's knee joint and that passive motion would be begun from the second day on. It seems reasonable that the more screws that are used, the less is the individual strain upon each one; hence the longer they will remain solid in the bone. Of course the earlier the mobilization, the better the chance for rapid union.

**Non-Union.** LYLE (*Annals of Surgery*, 1913, page 284) has injected the patient's own blood between the ununited fragments with excellent results. ONORATO (*Gaz. Med. Lombarda*, 1913, page 9) used osmic acid injections for the same purpose. R. E. FARR (*Journal-Lancet*, Vol. 33, page 432) in a rather suggestive article, ascribes the regeneration of bone to the presence of bone filings. So far, however, the autoplasmic transplantation of bone grafts has been widely adopted as the best method of treating non-union.

#### Neoplasms.

A case of sarcoma after a simple fracture was published by W. B. COLEY some time ago. Recently W. W.

\*A masterly article upon Operative Fixation of Fractures as a Cause for Delayed Union, by JOHN B. ROBERTS, of Philadelphia, appeared in the *Annals of Surgery*, 1913, Vol. 57, p. 545.

50 JOURNAL OF SURGERY. I. KROSS, L. N. SURG. I.

GRIFFIN (*Medical Record*, 1913, page 650) reported a case of sarcoma of the femur following plating for fracture.

JOHN C. A. GERSTER.

#### ARTICLES OF ESPECIAL IMPORTANCE.

##### HEAD.

###### *Diagnosis of Fractures of the Skull.*

C. E. Dennis, *Austral. Med. Jour.*, 1913, No. 101, p. 1090.

W. H. Stewart, *Arch. of Roent. Ray*, p. 346, 1913.

###### *Typical Fractures of Bones of the Face.*

Körte, *Deutsch. Med. Woch.*, 1913, p. 253.

##### SPINE.

###### *Operation for Fractures of the Spine.*

C. A. Elsberg, *Annals of Surgery*, 1913, Vol. 58, p. 296.

##### EXTREMITIES—GENERAL PAPERS.

###### *Mechanics of Fractures.*

Emmet Rixford, *Jour. A. M. A.*, Vol. 61, p. 916.

###### *Chronic Periostitis from Overexertion (leading to rarefaction and spontaneous fracture).*

Wolff, *Deutsch. Zeitsch. Militärärztl.*, 1913, Bd. 14, p. 548.

###### *Multiple Spontaneous Fractures in a Case of Osteopsathyrosis of Lobstein.* (There were 18 spontaneous fractures in a period of 19 years; for a year under administration of adrenalin, no fracture has occurred.)

L. Plisson, *Clinique*, 1913, p. 132.

(For spontaneous fractures, see also under Femur.)

###### *Intra-uterine Fractures.*

R. R. Smith, *Surg. Gyn. & Obst.*, 1913, Sept., page 344.

###### *Hist. of Surg. of Fractures.*

Lamotte, *Belgique Med.*, 1913, p. 387.

###### *Experimental Lengthening of Bones by Open Operation.*

Magnuson, *Surg. Gyn. & Obst.*, July, 1913, p. 63.

###### *Negative Pressure within Bones—Its Relation to Fat Emboli.*

Rothmann, *Munch. Med. Woch.*, 1913, p. 1664.

###### *Function of the Periosteum in Bone Transplants.*

C. A. McWilliams, *Surg. Gyn. & Obst.*, 1914.

###### *Regeneration of Bone.*

Hass, *Surg. Gyn. & Obst.*, 1913, Vol. 17, p. 164.

Petroff, *Zentralbl. f. die Gesamte Chir.*, etc., 1913, Bd. I, p. 277.

###### *Fracture Treatment in Dispensary.*

Skilern, *Internat. Clinics*, 1913, p. 190.

###### *Landmarks in the X-ray Picture Indicating Correct Reduction in Colles and in Potts Fractures.* (The centre line of the radius projected should pass between the 2nd and 3rd metacarpal bones; the centre line of the tibia should exactly bisect the talus.)

E. H. Skinner, *Arch. of Rönt. Ray*, 1913, p. 345; *Am. Quart. of Röntgenolog.*, 1913, p. 142.

##### UPPER EXTREMITY.

###### *Fractures of the Elbow Joint.*

Th. Voelker, *Med. Klin.*, 1913, pp. 441 and 489.

###### *Hyperextension and Backfire Injuries of the Wrist.*

C. S. Wallace, *Lancet*, 1913, p. 819.

##### LOWER EXTREMITY.

###### *Pelvis—Fracture of Floor of Acetabulum, etc.*

Pancoast and Skilern, *N. Y. Med. Jour.*, 1913, p. 1288.

###### *Neck of Femur.*

Whitman, *Lancet*, Vol. 184, p. 1649.

Bardenheuer (see Extension).

Cruet et Moure, *Bull. et Mem. de la Soc. Anat. de Paris*, p. 17.

###### *Trochanter.*

A. C. P. Ashhurst, *Ann. of Surg.*, Oct., 1913, p. 494.

Roth, *Ergeb. d. Chir. Orthop.*, Bd. 6, p. 109, 1913.

###### *Atrophic Femur.*

Brandes, *Max, Beiträg. z. K. Chir.*, 1913, p. 651.

Lejars, *Semaine Méd.*, 98.

###### *Knee Joint.*

Blake, *J. B.*, *Ann. of Surg.*, Vol. 58, p. 27.

Binney and Lund, *Boston Med. & Surg. Journ.*, p. 49.

###### *Patellae (both).*

Steinke, *C. R.*, *Boston Med. & Surg. Journ.*, p. 510.

###### *Spine of Tibia.*

Jones, Robert, and S. A. Smith, *Brit. J. of Surg.*, Vol. 1, No. 1, p. 70.

###### *Tibia.*

Destot, *Lyon Chirurg.*, 256 and 391, Vol. —.

###### *Calcaneum.*

Soubeyrau and Rivès, *Rev. de Chir.*, p. 429, Vol. —.

Reiner, Hans, *Zeitschr. f. Orthop. Chir.*, 1913, p. 155. *Scaphoid.*

Horwitz, A. E., *Ann. of Surg.*, Vol. 58, p. 526.

#### General Principles for the Management of Fractures.

W. L. ESTES, South Bethlehem, Pa. *Medical Times*, December, 1913.

In this article, which is designed as a guide for the general practitioner, Estes lays down a number of important rules to be observed in the treatment of fractures. Among them are the following:

First aid in fracture cases: The first consideration is the utmost care in handling the individual and the injured member so as to minimize shock. After assuring himself that the ends of the fragments are not so placed that they endanger the skin or some important structure, the physician should fix the limb in the position in which it is found. Never attempt to reduce the end of a projecting bone in a compound fracture, but try to keep it from getting back under the skin until it has been thoroughly cleansed and disinfected.

In the opinion of the author it is almost always necessary to give an anesthetic during reduction. In beginning traction for reduction always extend first in the direction of the axis of displacement. Molded plaster-of-paris splints are the best, as they can be adapted to the particular fracture and to the individual contour of the fractured part.

Two factors enter into the ideal issue of every fracture case, namely, first, the result should be the restoration of the complete function of the extremity; second, the limb should show no distortion nor any marked deviation from the normal. Estes believes that both of these results are rarely attained. No fracture of any degree of seriousness should be treated without the use of the Roentgen rays.

#### Traumatic Dislocation of the Hip in Children. (*Beitrag zur Traumatichen Hueftgelenksluxation bei Kindern.*)

E. BOEHKE, Halle. *Archiv. fuer Klinische Chirurgie*, November 5, 1913.

Traumatic dislocation of the hip, uncommon at any age, is very rare in childhood. The injury in young individuals generally results in diaphyseal separation at the upper end of the femur. The author has collected twenty-nine cases of dislocation in childhood and reports an additional one that is quite typical of most of those previously described. The patient, a healthy boy five years old, fell from a height of several feet and was found unconscious. Two months later, after varied treatment for the condition of the hip had been applied, he was taken to the clinic. There was a deep depression in the left inguinal region; the left leg was in a position of inward rotation, flexion, and adduction. The great trochanter was displaced above Nelaton's line, and was much nearer the anterior superior iliac spine than on the normal side. The femoral head, absent in the normal position, was distinctly felt in the posterior surface of the ilium. An actual shortening of the left leg (3 cms.) was determined. X-ray examination established the diagnosis.

Two vigorous attempts to reduce the dislocation under narcosis failed. An open operation was therefore performed. The incision was carried between the fibres of the glutei to the femoral head. The latter was found firmly imbedded in scar tissue, but free from any serious damage; a new cavity for the head of the bone had not yet formed. Upon exposing the acetabulum it was found filled with massive inflammatory tissue. This was removed with considerable difficulty and the surgeon found it impossible to avoid excising some of the underlying cartilage. Reduction of the head of the bone still remaining impossible, the capsule had to be partly divided and the musculature subperiosteally separated from the great trochanter. The reduction was then readily accomplished. The musculature was sutured in place and the capsule closed.

Although several attempts at early mobilization of the hip-joint after the operation were made, almost complete fixation was the final outcome. Roentgenographs showed that the head of the femur was in the normal position.

The procedure for and the results of this case of old dislocation of the hip in a child correspond with the other similar cases reported in the literature.

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## STRAIGHT DIRECT LARYNGOSCOPY BRONCHOSCOPY AND ESOPHAGOSCOPY.

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### CHAPTER I.

#### INTRODUCTORY.

Since the examination of the larynx, bronchi and esophagus by the direct method requires a steady hand and extraordinary skill in handling instruments, it is imperative that the beginner should practice on the dummy and on animals before attempting to pass the tubes on the human subject. A good knowledge of the anatomy of the parts should be acquired in the dissecting room, for on it depends the successful solution of the many problems which will present themselves to the bronchoscopist. After one becomes expert, the handling of the instruments is secondary to that confidence which is born of a thorough anatomical study. At the beginning, let it be understood that to learn direct laryngoscopy, bronchoscopy and esophagoscopy well means hours of hard work and disappointment. But one who is ambitious and persevering may rest assured that success will eventually be his. In order to have a clear understanding of what is before one, it will perhaps be better to describe briefly the instruments which are used in the direct examination of the respiratory tract and the esophagus. The two classes of instruments are those devised by Jackson in this country which have the light on a light carrier at the end of the tube and those of Killian and Brunings in Europe which depend for illumination on an electric head light or an electroscope.

The Jackson instruments consist of

One laryngoscope measuring 16 cm. in length and 16 mm. in the inside diameter for adults.

One laryngoscope measuring 14 cm. in length and 12 mm. in the inside diameter for children. Both instruments are made with a separable slide which can be removed when occasion demands as will be explained further on.

One bronchoscope measuring 40 cm. in length and 9 mm. in the inside diameter, the extra large tube for adults.

One bronchoscope measuring 40 cm. in length and 7 mm. in the inside diameter for adults.

One bronchoscope measuring 30 cm. in length and 5 mm. in diameter for children.

One bronchoscope measuring 30 cm. in length and 4 mm. in diameter for children.

One esophagoscope measuring 53 cm. in length and 10 mm. in the inside diameter for adults.

One esophagoscope measuring 45 cm. in length and 7 mm. in the inside diameter for children.

Three probes of different lengths for larynx, bronchi and esophagus.

Three hooks of different lengths for larynx, bronchi and esophagus.

Six cotton carriers for the larynx and bronchi, supplied with screw cuffs to hold the cotton securely.

Six cotton carriers for the esophagus, supplied with narrow cuffs.

One double dry cell battery for lighting the small lamps. The battery has four cells on each side which makes it possible to light two tubes at the same time, the advantage of which will be explained further on.

One tracheoscope measuring 17 cm. in length and 8 mm. in the inside diameter for use through a tracheotomy wound in adults.

One tracheoscope measuring 14 cm. in length and 5 mm. in the inside diameter for children.

Forceps and special instruments will be described later. The writer has all the above instruments in his outfit and has used each of them.

Brunings uses a hand light or an electroscope which is attached to a controller as a means of illuminating his tubes. It consists essentially of a large electric lamp covered by a hood reflector through which the light is reflected on to a mirror which in turn sends the light down through the tubes. The instrument has a convenient handle for holding and below the mirror is an attachment for

the various tubes. As a necessary equipment, Brunings gives

1. The electroscope with supplementary lamp and aseptic cord.
2. The double extension tubes Nos. 1-5. No. 1 (14 mm.) for esophagoscopy. No. 2 (12 mm.) for bronchoscopy, with a second long unperforated sliding tube for esophagoscopy. Nos. 3-5 (10, 8.5, 7 mm.) for bronchoscopy.
3. Two autotomy spatulae of 13 and 11 mm. diameter. One autoscopic spatula for children.
4. Special bougies for 1, 2 and 3.
5. Two bronchoscopic forceps, 25 and 35 cm. long with five interchangeable end pieces.
6. One esophagoscopic forceps, 50 cm. long with two interchangeable end pieces.
7. A saliva pump with three tubes, 25, 35 and 50 cm. in length.
8. Two hooks for foreign bodies.
9. One dozen double wool carriers. And unless the utmost economy is demanded, he recommends in addition
10. One extension tube of a diameter between Nos. 4 and 5—that is about 7.75 mm.
11. One counter pressure instrument (useful with operative instruments).
12. One short special strong clutch forceps for foreign bodies firmly fixed at the entrance to the gullet.
13. A combined syringe and drug applicator.
14. A glass jar for keeping the forceps in soap spirit.
15. Rectangular spatula for trial autotomy.
16. One very delicate forceps, 17 to 18 cm. long without end pieces for children.
17. Endoscopic telescope.
18. Prism for double eye piece for two observers.
19. A dilating extractor for foreign bodies embedded in the gullet.
20. A dilating extractor for foreign bodies behind bronchial stenoses.
21. Concentric metal bougies for broncho-intubation.
22. Tracheograph tracheometer.
23. Counter pressure autoscope for endo-laryngeal operations under general anesthesia and special operating instrument.
24. Dynamometric dilator for cardiac end of stomach and upper end of gullet.
25. Speculum instrument for endoscopy in children (electroscope for children).
26. Tracheal funnel.
27. Forceps for children.
28. Autoscope for direct autotomy of the larynx.

29. Operating instruments with special objects.

30. Forceps.

31. Loop extractor.

32. Collar stud forceps.

33. Medicament applicator.

This outfit is mentioned to show the multiplicity of instruments which some men consider necessary for successful work and which tends to frighten those who would take up bronchoscopy. Besides Jackson's instruments mentioned above, the writer has found the modified laryngoscope, measuring 17 cm. in length and 10 mm. in the inside diameter, particularly valuable. It will be referred to in detail under direct laryngoscopy. Other instruments in Jackson's outfit which are needed occasionally are the safety pin closer, the peanut extractor, forceps for dilating a stenosis in front of a foreign body and a pin finder. In buying an outfit, it is a mistake to economize though one does not need all the instruments enumerated by Brunings. It is difficult to decide which of the two outfits is the better. Having worked with Jackson's instruments, the writer prefers them. The mirror

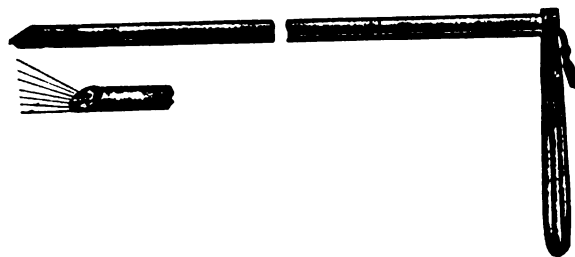


Fig. 1. Jackson's Self-Illuminating Tracheobronchoscope.

in Brunings' handle has a slit in it and it is difficult to learn to work through it after having used the open tubes. The use of a suitable chair and table is important and will be referred to under the writer's special methods. In certain bronchoscopic and esophageal cases, increased secretion is a serious hindrance and it is necessary to pump it out. At the Presbyterian Hospital a water pump attached to a spigot is used successfully for this purpose. As a part of any outfit, there should be tracheotomy instruments because one never knows when he will be called upon to open the trachea.

Forceps. Special attention will be directed to forceps because, next to the tubes, they are the most important instruments for the bronchoscopist. The three types commonly in use are those of Jackson, Brunings and Pfau. The Jackson forceps has a scissors handle into which fit the different length tube biters for the larynx, bronchi and esophagus; they are satisfactory for the 10, 9 and 7 mm. tubes but are too large for the smaller bronchoscopes. In addition to the foreign body tips, there are vari-

ous shaped tips for removing tumors, etc. Dr. S. H. Large of Cleveland has devised a slender forceps to fit the scissors handle which is small enough for the 5 and 4 millimeter bronchoscopes. Brunings' extension forceps is a satisfactory instrument because it is slender enough for the smallest tubes and the handle is curved out of the line of vision. As its name implies, it can be made longer or shorter, and is essentially a foreign body forceps. It has various tips, the most useful of which according to Brunings is the "claw tip." Another useful tip is that devised by McCoy for closing and removing open safety pins. Pfau's model is the ideal instrument for rough work such as the removal of tumors, specimens for microscopic examination, etc. They are the best forceps for impacted foreign bodies. Into the handle fit the different lengths of tubes. It is the instrument of choice for larynx work and for the removal of foreign bodies through the 9 mm. tube.

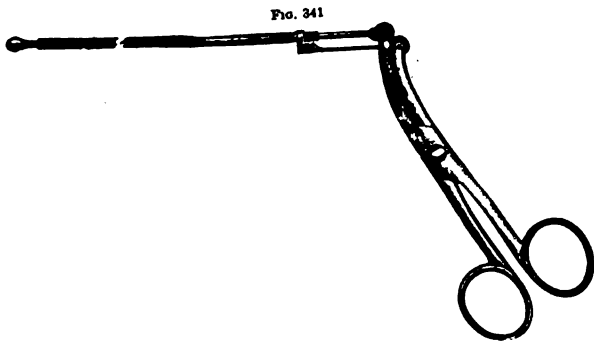


Fig. 2. Jackson's Long Forceps for the removal of foreign bodies by Bronchoscopy.

Practice with the dummy and with animals. The dummy suggested by Killian can be obtained from instrument makers. The only objection to it is its cost, but as it represents the larynx, trachea and bronchi with branches, it is suitable for passing the tubes and trying all sorts of operations. Dogs are easily anaesthetized with small doses of morphine and hyoscine and can then be used for experimental purposes. While passing the tubes is much easier in animals than in the human being, one learns how to handle instruments and to estimate distances in the trachea and bronchi which is difficult always. If the writer were asked the most difficult part of the removal of foreign bodies, he would answer the ability of the eye to estimate distance. The beginner should practice touching certain spots through the tubes passed on the dummy or animals. For the same reason this practice should be persisted in through short tubes, preferably the laryngoscopes until the eye has gotten the proper perspective for distance. When these points have been mastered, the most important preliminary work has

been done and the operator may safely attempt bronchoscopy and esophagoscopy in human beings provided he has patience and perseverance, for the work must be done most carefully and one must look for failure after failure which will tax his patience to the utmost. The writer does not believe in practice on the cadaver for *rigor mortis* makes the work too difficult while, after it passes off, the tubes slip in too easily.

## CHAPTER II.

### ANESTHESIA, LOCAL AND GENERAL. THE USE OF OXYGEN.

While anesthesia will be taken up more particularly under the different operative procedures, it may not be amiss to give here a few general observations from the writer's experience. The value and methods of local anesthesia have been discussed for years and opinions now are probably as diverse as in the beginning. Some laryngologists still use cocaine in all operative work despite the fact that it is the most toxic of all local anesthetics. This fact has been proven time and time again not only by actual experience but by unprejudiced comparison with other drugs. Having used all the local anesthetics in larynx, bronchi and esophagus during the past five years, the writer is prepared to say that two drugs are far less toxic than cocaine and when used properly are just as efficient in producing anesthesia. Moreover, they do not give rise to an exhilarating effect and there is no danger of a habit with prolonged use. These drugs are alypin and novocain, both of which have been used often in operative work in larynx and bronchi in strong solutions and in larger quantities than one would dare use cocain. Notwithstanding the fact that the *Journal of the American Medical Association* claims that alypin is just as toxic as cocain, a fair comparison is all in favor of the former drug. The writer after an extensive use of alypin and novocain is prepared to state that the anesthetic properties of these drugs is just as great as cocaine; that the anesthesia lasts as long; that they can be used in stronger solutions; that they can be repeated as often as may be necessary; and that he has never seen toxic symptoms from their use. In many cases the quantity used has far exceeded the dangerous point of cocaine. In patients susceptible to cocaine, the substitution of alypin enables the surgeon to work without worry. In the clinic of the Presbyterian Hospital, alypin is regularly used as having a quicker action than novocain. In children, 4 years old and under, no anesthetic, local or general, is used in direct laryngoscopy, bronchoscopy or esopha-

goscopy except in the case of a sharp foreign body or a pin. The patient is simply held and the examination made as will be described later. In older children up to 8 years of age, no anesthetic is used for direct laryngoscopy and the examination of the upper end of the esophagus; for bronchoscopy and deep esophagoscopy, ether is given after a preliminary injection of atropine. In adults practically all examinations of the larynx, the bronchi and the esophagus are made under alypin anesthesia. If the examination is to be a long one, the patient is given atropine. The former method of giving morphine hypodermically has been discontinued except in very nervous individuals. While no bad effects except nausea have been noticed, its use is unnecessary in most patients. The writer has never tried to do direct laryngoscopy, bronchoscopy and esophagoscopy without local anesthesia as has recently been advocated by a prominent bronchoscopist. While some patients may tolerate the tubes without anesthesia, the average patient in the average clinic will be more tractable if he realizes that one is doing all he can to prevent pain. And with such a safe anesthetic as alypin, the slight increase in time is a small consideration.

**Method of using local anesthetics.** Alypin and



Fig. 3. Jackson's Forceps, Curved Jaws. Jackson's Forceps, Cupped Jaws.

novocain are used in 20 to 30 per cent. solutions. When time is a factor, 30 per cent. solution is used. Usually 20 per cent. solution answers every purpose. With a curved applicator the anesthetic is applied to the pharynx and base of the tongue and to the larynx if possible. After waiting one or two minutes, the direct laryngoscope is passed and the epiglottis pulled forward. Another application is then made directly to the larynx. No effort is made to squeeze the excess of the solution out of the cotton because it does no harm. In a few minutes the larynx is ready for prolonged examination. If the trachea is to be examined, an applicator loaded with 20 per cent. solution is passed down through the laryngoscope to the bifurcation or a 4 per cent. solution is sprayed into the trachea. In esophageal examinations one application of 20 per cent. solution is made. Though alypin has not been tried in children, the writer feels sure that it can be used safely. In some adults enormous doses have been used with no after-effects. When it is necessary to use general anesthesia, ether is pre-

ferred. When given warm it probably has no more serious effect upon the lungs than chloroform. A very useful drug to decrease nervousness and irritability, especially if given in full doses a day or so before the examination is bromide of soda. The writer has used it with the greatest success in patients who balked at the first examination. In all tube work under ether it is well to have an oxygen tank in readiness for emergency. In Brunings' work on bronchoscopy there is a table which illustrates so well the more prevalent use of general anesthesia in Europe than in this country that it is well worth inserting in a monograph of this kind. American operators are gradually getting away from general anesthetics as greatly increasing the dangers of tube work. It is the exception that an expert bronchoscopist gives a general anesthetic in examining or operating in the larynx. In esophagoscopy it is certainly the exception unless sharp foreign bodies are to be removed and in bronchoscopy it is being used less and less in children under 6 years of age. Brunings says: "In order to give a true idea of the practical significance of anesthesia when the indications are correct, I insert a small table which shows the frequency of or rarity of their use in the direct examination and operative performances during recent years in Kilian's clinic. In judging of these numbers it must be borne in mind that they have reference only to clinical cases. All instances of endoscopy on practised persons and for the purpose of teaching and demonstrating are excluded. On the other hand, in most examinations the duration of the operation has been increased in consequence of demonstrating for doctors or students."

#### CASE PERCENTAGE OF GENERAL ANESTHESIA.

	Over 10 Years.	Under 10 Years.	Gen- eral.
Nature of examination.			
Direct laryngoscopy .....	0	57	18
Upper tracheoscopy .....	0	100	4.4
Upper tracheo-bronchoscopy ..	3	100	22
Lower tracheoscopy .....	0	0	0
Lower tracheo-bronchoscopy ..	?	?	(6)
Direct hypopharynxgосopy and esophagoscopy .....	3	90	6.5

"It will be seen from the first vertical percentage column that in the case of adults including children over 10 years of age anesthesia was resorted to very rarely and only for upper tracheo-bronchoscopy and direct esophagoscopy. They were mostly cases of timid children or patients with a lesion which would render examination painful. The middle collection shows that in the case of little chil-

dren—most of them under six—a general anesthetic was almost always used, often indeed, for direct laryngoscopy if a direct operation was intended. It may be taken for granted that the counter-pressure method will permit some restrictions in the use of a general anesthetic even in these cases. . . . The surprising result that the total for direct laryngoscopy shows a considerable percentage of anesthetics is due to the fact that direct inspection in little children is generally the only chance for laryngo-tracheoscopy (difficult decanulation) and laryngeal operations." It is safe to say that such wholesale general anaesthesia in direct laryngoscopy will not be approved of in this country. In direct laryngoscopy in children under 10 years of age no anesthetic, local or general, has been used at the Presbyterian Hospital for some years. In small tumors situated anteriorly on the vocal cords, general anesthesia may be necessary but in all other conditions with the method of examination and treatment to be described no anesthetic is used. If chloroform is used as an

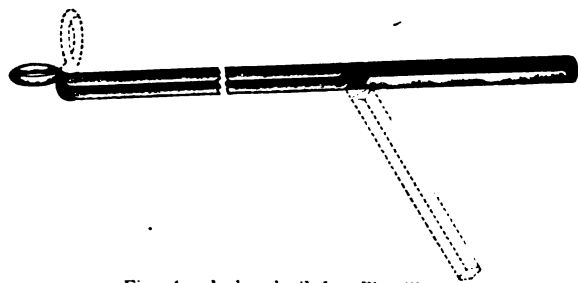


Fig. 4. Jackson's Safety-Pin Closer.

anesthetic, it should be given by an expert since it increases the dangers of tube work.

The inhalation of oxygen is of such importance, it will not be amiss to quote the following from Brunings: "1. Breathing of oxygen not infrequently renders tracheotomy unnecessary in the case of acute obstruction to breathing which may be overcome in a few hours, *e. g.*, laryngeal edema and reactionary swellings. 2. Breathing of oxygen admits of many examinations and operations being performed without tracheotomy, *e. g.*, speculum examinations in serious dyspnea, dilation of laryngeal stenoses, removal of tumors which are causing obstruction. 3. Hurried tracheotomy is unnecessary when oxygen is inhaled and the operation may be performed deliberately and carried out in the best manner. Patients with severe dyspnea are then able to endure the operation easily lying on their back with the head extended. A light, portable oxygen apparatus should be at hand as a first expedient, when urgent tracheotomy is performed at private houses. 4. The endoscopic extraction of

foreign bodies which cause obstruction is sometimes only possible with the assistance of oxygen breathing. I remember a case of a movable foreign body (bean) in the trachea occurring in a child who became very cyanosed and cold at the extremities. By the immediate application of oxygen respiration (at first artificial) I was able to bring the child back to a state of eupnea and as soon as the necessary apparatus was provided, the foreign body was removed by upper tracheoscopy. Inhalation of oxygen is of course of great importance in endoscopy for other purposes besides acute cases of foreign bodies. It need only be observed that direct examination has often to be effected with patients whose obstructive breathing has first to be accounted for. If it is also remembered that the introduction of a tube from the mere fact of the unnatural position required, increases any existing dyspnea and that the excitement and reflex coughing greatly intensifies the air hunger, it is not necessary to insist on the utility of the oxygen cylinder in endoscopic examinations. It is self evident that in all cases here mentioned, whenever general anesthesia was necessary, the only kind of anesthesia worth considering was that with chloroform-oxygen. It must, however, be repeated that in cases of serious dyspnea, any kind of anesthesia is contraindicated and generally speaking endoscopy of the air passages when there is shortness of breath presupposes a perfect mastery of endoscopic technic, tracheotomy and the application of oxygen. Threatened collapse may be warded off a long time by the inhalation of oxygen. If however, this expedient is pushed too far, collapse is correspondingly more dangerous."

(To be continued.)

#### CLINICAL ORGANIZATION IN THE MODERN HOSPITAL.

What is most characteristically "modern" in the efficient hospital of today (and in this sense hospital efficiency is almost unknown in this country) is a clinical organization so composed as to insure prompt and effectual attention to any disease or combination of diseases that may threaten life or health. The keynote of modern medicine is co-operation. To study the hospital unit, looking neither to the right nor to the left, is to suffer ourselves to be led away from and not toward this vital principle. Hospital planning which ignores the possibilities of cooperative medical practice misses its greatest opportunity.—S. S. GOLDWATER in *The Modern Hospital*.



## A PLEA FOR THE EARLY SURGICAL TREATMENT OF INTUSSUSCEPTION.\*

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In the treatment of intussusception there are but two available methods: the first by taxis and inflation of the colon either by water or air, with or without an anesthetic; and the second by laparotomy with reduction of the invagination by direct palpation or, if that is impossible, by resection of that portion that is gangrenous or that will evidently become so.

While it would be inadvisable in some instances not to attempt the bloodless method providing the diagnosis be made very early and the case be one of the colic or ileocecal variety, yet the lives of the patients who have come to us for operation, would have been jeopardized by such procedure as, with one exception, plastic exudate had already formed, which precludes reduction without direct palpation of the intestine.

The opponents of operation in this condition will endeavor to show that although by bloodless method the mortality is about 70%, that the operative treatment will give a mortality in all of about 65%. But if one will analyze the latter statistics, he will find that the great majority of fatal cases were cases that required resection of the bowel.

Since 75% of all cases of intussusception occur in the first two years of life, and 50% of this number in the first year, the mortality of resection is readily explained, for the young child will stand lengthy intestinal operations but poorly, and intestinal resection is an extremely severe operation at any age.

To emphasize this point I beg to quote the following statistics of resection for intussusception compiled by Dowd<sup>1</sup>, which show the futility of waiting until resection is the only recourse.

In Chubb's Australian series of 127 cases, there were eight resections with one recovery.

In Eccle's St. Bartholomew's Hospital report of 89 cases, there were nine resections with no recovery.

Makin's reports 202 cases with 12 resections, giving two recoveries, both in adults.

Koch and Oerum report in 400 cases in Danish children eight resections with no recovery.

So it is seen that the cases which progress to the condition requiring resection, are practically hopeless.

If the pathology of the condition were but born in mind, the danger of gangrene rapidly ensuing would be evident. The mesenteric vessels are rapidly compressed by the enveloping bowel becoming edematous, converting the neck of the invagination into a constricting ring. Rapidly following, there are adhesions forming between the four or more peritoneal layers involved and finally gangrene of the intestinal walls.

Treves<sup>2</sup> has divided the condition clinically into the (1) ultra acute, (2) acute, (3) sub-acute and (4) chronic. Upon seeing a case, particularly in children, it is obviously impossible to tell without opening the abdomen in which category the case will belong.

To temporize in the acute and ultra-acute types means gangrene, and probably fatal peritonitis.

I have previously reported<sup>3</sup> eight cases of intussusception in children with two deaths: one of which was resected, having gone 72 hours. The other case was an infant of eight days which expired as the incision was made. I have since had two cases, boys of 6 months and 3 years, respectively, with successful outcome; making a total of ten cases with a mortality of two, or 20%.

The favorable results are due to the fact that all the cases were operated upon in the first 10 hours, with the exception of the girl who required resection, and whose case had progressed about 72 hours. The infant of eight days had never had a successful bowel movement.

The youngest of the series of 8 successful cases was 5 weeks, and the oldest 3 years. Of these cases seven were boys.

Koch and Oerum<sup>4</sup> report 400 cases in Danish children in which 60% occurred in the first year; of these two-thirds occurred in the 5th to 7th month. During the second year no more cases occurred than in the 5th and 6th month. The frequency of the condition decreases rapidly with advancing age. The proportion of the boys to girls was 2.2 to 1. They show under the first year that 52% died without operation, and that the operative mortality of the balance was 74%. Upon analyzing their deduction we find that in a vast majority of cases the bloodless method had been tried and they advise such treatment for at least 12 hours.

To the family physician must be given credit for the early or late interference by the surgeon, for upon his diagnosis rests the proper early treatment.

Too much importance can not be placed on the digital examination of the rectum and bimanual recto-abdominal examination in all cases of acute abdominal pain in children.

\*Read before the Allegheny County Medical Society, June, 1913.

Pain has not been a marked symptom in my cases contrary to text-book description.

It might be well at this point to review the classical symptoms.

1. Sudden attack of crying and pain more or less spasmodic.

2. Vomiting, which is uncontrollable.

3. Blood from rectum usually a few hours after onset.

Blood occurs in 80% of cases; and blood on the diaper of a previously healthy child always demands further investigation.

4. Palpation of a tumor of a wandering type or a "uterine cervix"-like mass in the rectum. As 75% of all cases are of the ileocecal type, the mass will be felt most frequently in the right inguinal region.

5. Shock at some time in the history of the case. The prostration is always marked.

In conclusion it is evident that early surgical intervention is the only safeguard against a condition of irreducible intussusception that means practically 100% mortality in infants and children.

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#### PAIN IN INFANCY AND SENILITY.

The reason why the aged or the infant show but few symptoms of their disease is that there is usually little or no pain and slight, if any, tenderness or muscular rigidity. The reason why there is no pain is that in senility the brain is deteriorated, while in infancy the brain is so undeveloped that the cerebral mechanism of associative memory is inactive; hence, pain and tenderness, which are among the oldest of the associations, are wanting. Senility and infancy are by nature normally narcotized. Senility is passing through the twilight into the night; while infancy is traversing through the dawn into the day.—GEORGE W. CRILE in the *Pennsylvania Medical Journal*.

#### DIAGNOSIS OF OBSCURE APPENDICITIS

Again and again have I found suspected cases showing none of the usual signs; no tenderness, no referred pains on deep palpation may be elicited in the first examination, but when one repeatedly presses and even rolls the cecum and, presumably, the appendix, at say, four-hour intervals, and treats the left iliac fossa in precisely the same manner as a control, if there is chronic appendicitis there will usually develop after several vigorous examinations a definite and sometimes a high degree of tenderness in the right fossa, while the left remains negative. I can not overstate the importance of this method.—GEORGE W. CRILE in the *Pennsylvania Medical Journal*.

## INJURIES OF THE PERIOSTEUM.

### WITH ESPECIAL REFERENCE TO THEIR RELATIONS TO THE PATHOLOGY AND REPAIR OF FRACTURES OF THE BONES.

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Injuries of the periosteal sheath of the bones almost never occur alone. Very rarely, one finds a sub-periosteal hematoma of smaller or larger extent, existing without any other demonstrable lesion in the neighboring tissues, but as a rule, sufficient diligence shows the presence of the results of traumatism in the adjoining bone or muscle.

In the great majority of cases, these injuries are associated with the various varieties of bone fractures; next in order, with contusions and lacerations of the soft parts, either open or subparietal; thirdly, with dislocation of the bones from their normal joint relationships; and lastly, with sprains and contusions of the ligamentous structures of the joint capsule. In those cases where a really careful search fails to disclose any accompanying lesion of the neighboring structures, it is very probably true that some underlying cause, as the undermining results of rickets, scurvy, or hemophilia, has furnished a ready predisposition.

The periosteum is very tough and strong, and forms an enveloping sheath for the many bones of the skeleton. Each individual bone is closely infolded by the periosteum, with the exception of those parts, usually the ends of the bone, that are sheltered in the capsular structures of the joints, within which the bone takes its allotted part. Where the ligamentous structures of the capsule end, and the layers of the periosteum begin, their connective and elastic tissue fibers blend and become continuous with one another, and some of the fibers can be seen also to become prolonged into the hyaline matrix of the articular cartilage covering the ends of the bone.

The periosteum itself is attached to the underlying bone, both by the nutrient small bloodvessels, which it sends downwards into the interior of the bone, and by longer and shorter connective tissue fibers, usually designated as the fibers of Sharpey, which, passing into the osseous tissue, become lost among its lamellae. These together may cause the periosteum to adhere very intimately to the shaft of the bone, as one finds in the vertebrae or at the free ends of the floating ribs; or, on the other hand, they may be very few in number, as in the bones of the vault of the skull, and giving a very indifferent attachment, thus accounting for the ease with which

the periosteum can there be liberated. At certain areas corresponding to the origins and insertions of the muscles, the adhesion of periosteum to bone is especially intimate: here the fibers of the tendons, of the periosteum, and near the articulations, of the joint ligaments, are most closely blended, exceptionally strong, and protrude downwards among the osseous lamellae, for an extraordinary distance, thus affording a very effectual anchorage. This accounts for the fact that fairly often a powerful muscular contraction will tear away a thin shell from the cortex of a bone, causing what has recently been designated a sprain-fracture.

Under the microscope, one distinguishes two layers in the periosteum. The inner layer, more solidly built than the outer, is composed of connective tissue bundles, among which are numerous elastic fibers, these latter also being prolonged into the bone along with Sharpey's fibers. The outer periosteal layer carries a close network of blood-vessels which, with the lymph and nerve plexus, furnishes nourishment to the bone. It is very important that the integrity of the circulation between the periosteum and bone be maintained; otherwise the nutrition of the bone may become insufficient and more or less caries is likely to result. The so-called nutrient artery to the bone, furnishes nourishment chiefly to the bone marrow; its anastomoses with the periosteal circulation are not overabundant, and the current of blood in each is distinct.

The periosteum covering the bones of the skull is distinguishable by the fact that it is entirely devoid of elastic fibers. This probably accounts for the frequency with which lacerations of the scalp extend down through the periosteum without any fracture of the cranial bones. The absence of any elastic tissue precludes the possibility of sufficient "give" to the pressure of a blow, directed throughout a linear application, and a separation consequently occurs. In these cases, it very frequently happens that a part of the bone exposed in the bottom of the fissure, owing to the impoverishment of the circulation (mention of which has already been made), undergoes cellular death, and delays the healing of the wound until the resulting sequestrum is exfoliated.

Between the bone and the periosteum one can demonstrate microscopically a stratum of large polyhedral or irregularly shaped cells, supported in a loose connective tissue layer. These cells, the so-called osteoblasts, are the progenitors of the bone corpuscles, which are sheltered in the lacunae of the Haversian systems. The osteoblasts have for their

function the depositing of a calcareous intercellular substance, the essential constituent of osseous tissue. In their natural development as soon as the osteoblasts are transformed into bone corpuscles, this property becomes latent and can be reawakened only on special occasions, as in the repair of a fracture or the transplantation of a segment of bone. After a bone has reached its mature stage any new formation of bone is accomplished by the osteoblastic layer of the periosteum. Whenever, for one reason or another, the membrane is forcibly separated from the underlying bone, one of three conditions may prevail: first, all of the osteoblasts may cling to the periosteum; secondly, they may all adhere to the bone (and this is very rare); third, and this is the usual condition, most of the bone-forming cells cling to the periosteum, and a few remain

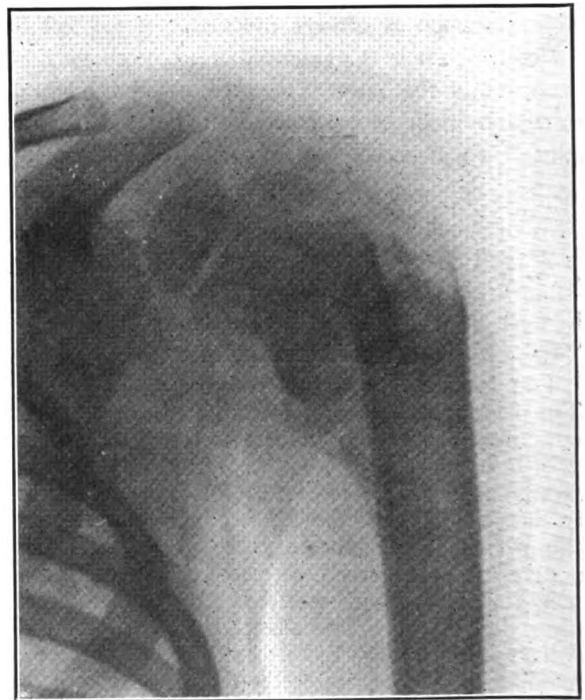


Fig. 1.

attached to the bone. All of these facts are of importance in explaining some of the traumatic and post-traumatic conditions of the periosteum.

#### CONTUSIONS OF THE PERIOSTEUM.

Contusions of this membrane are generally trifling in their extent, although they give, proportionately to their severity, an extraordinary amount of pain. They are most frequently met over the crest of the tibia. Sprains and contusions of the ligamentous structures of the joints are often accomplished by contusions of the periosteum.

#### HEMATOMA OF THE PERIOSTEUM.

This condition is one frequently met. The bleed-

ing may take place between the outer vascular and the inner fibrous layer, or between the inner fibrous layer and the bone. Only in the latter case is it proper to designate these hemorrhages as subperiosteal, and clinically it is very often impossible to distinguish between the two.

In the first type, hematomata are apt to be larger than in the second but, as a rule, they are very rapidly absorbed. They never leave any permanent swelling or thickening of the bone. They occur most frequently in the long bones of the limbs, and in the bones of the skull, especially the frontal bone. When the hematoma is situated between the inner periosteal layer and the bone, the bleeding is derived from the vessels that perforate the cortex. These hematomata are apt to be small, except when they occur in the skull where, owing to the loose attachment of the pericranium, the bleeding will be limited only by the boundaries of the individual bone, at which the membrane is firmly attached. The hematomata are very slowly absorbed and, as a rule, they leave some permanent mark in a slight thickening of the bone. When their absorption is especially slow, a formation of new bone may increase the resulting thickening.

The cephalhematomata occurring at birth are usually situated close to the interparietal suture, and may be unilateral or bilateral. The extent of the bleeding is limited by the margins of the parietal bones. The bleeding may be subaponeurotic, or subpericranial. These hematomata are very rapidly absorbed, and only in exceptional cases do they leave any permanent mark.

Many of the patients with osteophytic overproduction of bone give a history of some trauma. Usually this history is ignored but a consideration of the trauma as a causal agent in the light of what has just been said, would make it appear not quite as innocent as it would seem.

#### LACERATIONS OF THE PERIOSTEUM.

Tearing of the periosteum may occur as a subcutaneous injury, or it may be an extension of a laceration of the soft parts. In the latter event, it may or may not communicate with the exterior through a rent in the skin. In the scalp wounds the laceration fairly often extends through the pericranium. An open tear of this nature is very rare in any other location. The common condition is a subcutaneous laceration, and this, of course, always is part of a larger lesion, such as a fracture or a dislocation.

#### INJURIES OF THE PERIOSTEUM ACCOMPANYING FRACTURES.

Fractures may be classified into groups, according as to whether there is no, little or much displacement.

The lesions of the overlying periosteum correspond very closely.

One group includes those fractures that have no displacement: some of these are of the greenstick variety, and some are impacted fractures. One accounts for the absence of displacement, either by an insufficiency of force, or by a very firm attachment of periosteum, fascia, ligament or tendon, which holds the fragments together, and makes fruitless to a large extent the fracturing force. An x-ray picture, taken after thorough healing, shows practically no callus. The periosteum is never in-

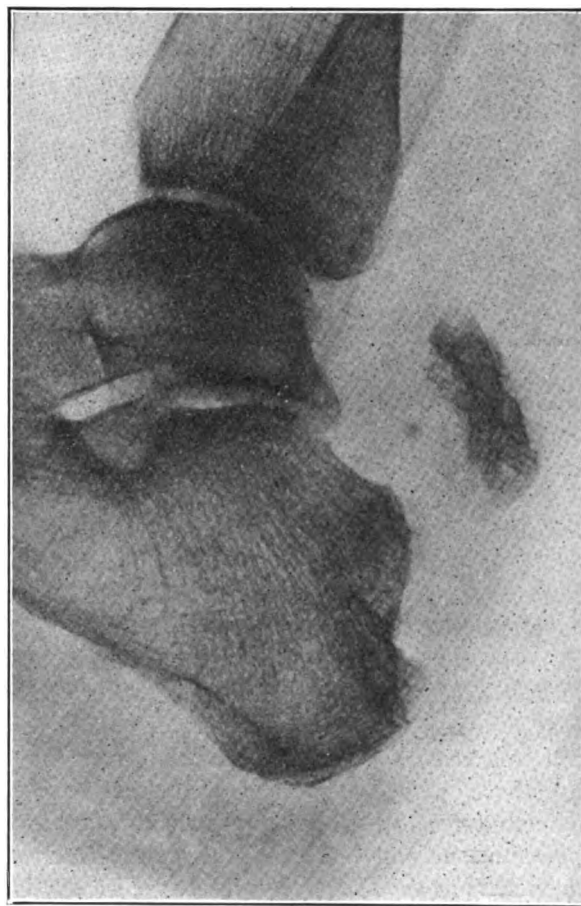


Fig. 2.

jured to any great extent; frequently, indeed, it is entirely uninjured. At most, only a slight tear is present. The important fact is that there is a minimum of exposure of the bone-forming cells, and therefore a minimum of callus. The fracture heals, as one might say, by "primary union." These cases include the greenstick fractures of the clavicle, radius and ulna, and some of the complete fractures of the bones of the hands and fingers.

The second group includes those fractures with little displacement. I include with these the greenstick fractures of the humerus and femur, and the impacted fractures at the lower end of the radius,

with an angulation of the shaft at the line of fracture. Here the callus formation is of moderate extent. The periosteum may be untorn with some of these fractures, and may be simply loosened from the shaft for a short distance from the line of fracture. A small cavity is thus formed which immediately fills with blood, and the healing here occurs, as it were, by "second intention." By this I mean that the osteoblastic cells, exposed on the periosteum, the surface of the bone, and on its cross section, fill up the space between and around the fragments exactly as granulation tissue fills up a wound in the soft parts. That applies also to the fractures with marked displacement. The periosteum may also be torn with fractures in this group, and the tear may be only on one side as in a greenstick fracture with angulation, or it may be torn all around, as in some of the fibular fractures and in some of the spiral fractures of the tibia. In some of the last group, the line of division of the periosteum may be at a different level from that in the bone, and the loose ends of the membrane may slip in between the fragments and delay the healing. The amount of callus is, as I have said, never very great.

I have frequently seen surgeons, while operating for fracture, define the periosteal flaps, and if these protruded between the fragments, cut them off flush with the ends. I believe that every bit of periosteum should be saved, however badly torn, and if, in order to obtain good apposition, it is found necessary to reset the ends, the section should be done subperiosteally.

The third group takes in all the fractures with much displacement, including those with marked separation in the axis of the bone and limb, those with marked angular and lateral displacement, and those with overriding; also many of the compound fractures, the gunshot fractures with comminution, and some of the sprain-fractures. They include especially, the fractures of the long bones of the arm and thigh, simultaneous fractures of both bones of the forearm and leg, and fractures in the neighborhood of the elbow and knee.

Whenever there is marked displacement, one never finds an intact periosteum. The tearing may correspond closely with the lines of fracture or, exactly reproducing them, it may be at a different level. The laceration may be circular or oblique, or it may follow the axis of the bone or limb. There may be more than one longitudinal tear, and if the periosteum is ripped away from the bone for a considerable distance, the membrane may hang in strips. The stripping up of the periosteum may be excessive, and may cause the baring of a consid-

erable part of the shaft of the bone, and thus impoverishing its blood supply, may lead to caries.

The laceration in the periosteum, whether longitudinal, oblique, or transverse, may not extend completely around its circumference. It may reach merely half or two-thirds of that distance, and leave a periosteal bridge which, forming a physical connection between the two fragments, will have a strong bearing in the healing of the fracture. There may be simply a rent in the periosteum, through which the ends of one or both fragments protrude more or less completely. When this condition is at its maximum, the healing will progress very slowly, there may be faulty or non-union, and an open operation will frequently be necessary. These fractures often show a marked degree of overriding. The amount of callus that forms, it goes without saying, is always excessive.

Probably the most frequent condition of the periosteum accompanying fracture, is one in which the periosteum is torn for only part of its circumference, leaving a bridge of membrane connecting the two fragments. The bridge itself may have an additional rent in it, or the fragments may be connected by several strips of periosteum at opposite points of the bone circumference.

If we take it for granted that the individual fracture has been treated with the best of skill, and reduction and immobilization have been carried out as nearly perfectly as human hands can, the effectiveness and rapidity of repair will depend to the largest extent on the condition of the periosteum. To be sure, the bone corpuscles exposed on the free section of the fracture, under the powerful stimulus of the reparative process, will call up their latent property of depositing osseous material but, as a rule, the total formation of callus from this source is very little, when compared with that formed by the periosteal osteoblastic layer.

The quickest and best healing is obtained when the fragments can be brought into good alignment and maintained in that position. Here the periosteum, however badly torn, is brought into closest relation with its appropriate segment of bone, the space between the fragments is practically nil, and the repair implies the least amount of work. When the fracture is complete, the callus, small in amount, will be uniformly disposed around the circumference of the bone; when the fracture is incomplete, the thickening will be still less, and limited to one aspect of the bone.

In those fractures with angular displacement, the convexity of the angle marks the area where the periosteum has been torn; the concavity, the area where a periosteal bridge is forming a physical con-

nection between the fragments. There is usually present on this side more or less stripping up of the periosteum. When allowed to heal in this position, callus forms between the bared bone and the stripped-up periosteum, in the concavity of the angulation, between the fractured ends, and to a much less extent on the convexity of the deformity. The periosteal bridge insures healing. If not corrected, deformity results, and if this be not excessive, a perfectly useful limb results. This variety is most apt to occur in the humerus and femur.

Figure 1 demonstrates the value of the periosteal bridge in the healing of a fracture with angular deformity. The periosteum can be seen stretching unbroken between the fragments, on the concave side of the fracture. Callus has filled the recess between the bared shaft and the loosened periosteum, and has filled the gap between the fractured ends. There is practically no callus on the convexity. Here the periosteum is completely torn. Although there is some deformity, the boy has a perfectly functioning arm. Case No. 900, series of 1913.

The periosteal injuries with fractures showing a lateral displacement are very similar to those with angular deformity. The periosteal connecting link may be single or multiple. However, just as frequently the periosteum is completely torn. If some part of the surfaces of the fractured ends are in contact, healing will be rapid, callus moderate in amount, and the final deformity very little. But if the lateral displacement is extreme, and the fragments are not in contact, repair will be slow, and the amount of callus and deformity excessive; or, in rare cases, there will be fibrous union or no union.

Fractures with separation in the axis of the bone and limb are notoriously slow in healing. This is accounted for by the fact that the periosteum is completely severed, and without some kind of a connection between the fragments, the bone finds great difficulty in bridging the gap. This variety is most common in the patella and os calcis.

When one of the fragments is disproportionately small, and consists of a thin cortical shell, corresponding to the insertion of a powerful tendon, such as the tendo Achilles or the patellar tendon, the condition has been called a sprain-fracture. It is almost unknown to obtain true bony union with fractures of this kind; one considers oneself fortunate, when a strong and effectual fibrous union is obtained. Even when a fresh fracture of this kind is treated by open operation, and the fragments are fastened together, the healing is by scar tissue only.

A middle aged woman came to the clinic, with the

story that she had fallen down a flight of steps. An x-ray picture showed a sprain-fracture of the os calcis. Operation was refused. Several months later, the x-ray demonstrated that there was no bony repair, although in walking only a slight limp was discernible, and the patient could rise on her toes to an appreciable extent. (Fig. 2.) Case No. 971, series of 1913.

Fractures with overriding are common in the long bones of the extremities. The extent of the shortening varies. The periosteum is never intact, and the tearing may follow any of the lines of laceration described above. Healing is very slow, the amount of callus excessive, the deformity marked. Fibrous union or pseudarthrosis may re-

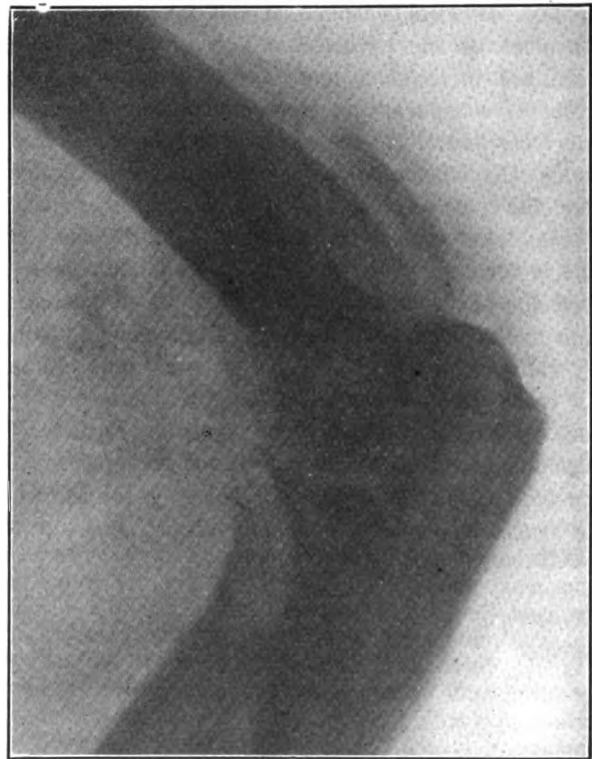


Fig. 3.

sult, and non-union is common if the shortening be not overcome. The ends of the fragments, bared of periosteum, may protrude through rents in the tube of periosteum which bridges the gap. The overriding may be accompanied by lateral, angular, or rotary displacement, and then the tearing of the periosteum is very irregular. When properly treated, healing should be obtained. There may be more or less deformity and thickening of the bone, but a useful limb should result.

Excessive baring of the shaft of the bone, on either side of the line of fracture, caused by a stripping up of the periosteum, is especially common with all compound fractures. This fact should



be given its due importance, in accounting for the frequent occurrence of necrosis of the fractured ends. The impoverishment of the blood supply, which occurs when the integrity of the periosteal circulation is disturbed, is amply sufficient to cause the death of the bone cells. This of course, is aided to a large extent by the addition from without of pyogenic organisms. I have seen this same necrosis occur in a simple fracture.

A young boy sustained a fracture of his radius. There was absolutely no wound of the skin. When the cast was removed, a sinus was disclosed, which lead to carious bone. There is no doubt in my mind that the shaft of the bone was denuded of its periosteum for a considerable distance. Case No. 1825, series of 1913.

#### INJURIES OF THE PERIOSTEUM WITH DISLOCATIONS.

Injuries of the periosteum accompanying dislocation are infrequent, and almost invariably they consist of a separation of the membrane from the underlying bone. As the head of the bone is forced through the joint capsule, it not infrequently strips away the periosteum from the bone, where the capsule blends with it, before the tear in the capsule itself is accomplished. When the dislocation is reduced the periosteum may return to its normal relation to the bone and, becoming agglutinated to it, may cause no trouble. Or, a formation of callus may take place between the bone and the periosteum, which, if it attain sufficient magnitude will be an insuperable obstacle to the proper performance of the joint movements.

A truck driver sustained a backward dislocation of both bones of the forearm. An enormous hematoma was present, and the ligaments were badly torn. At the end of a month, motion in the elbow joint was much restricted, and an x-ray photograph (Fig. 3) demonstrated a large mass of callus on the outer and ventral aspect of the humerus, extending upwards from the margin of the capsular attachment, which prevented any flexion beyond a right angle. Case No. 438, series of 1912.

No referata are given for the references to these conditions are few, and are found as very short remarks in a few of the very many articles written on associated lesions. The standard text-books provide very little. Bardenhauer's book is an exception. The greater part of this paper is based upon my own observations in the clinic.

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#### SURGICAL TECHNIQUE AND INFECTION.

The surgeon is no longer one who operates, no longer one who cuts vessels and ties them again; he is the one who can array the numerous factors that go to make recoveries, failures or deaths in such a way as to give the best results with the least risk, —W. A. BRYAN in *The Southern Practitioner*.

## SOME PRACTICAL NOTES IN SURGICAL PHYSICAL DIAGNOSIS.\*

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#### ABDOMINAL PALPATION.

Skilful and intelligent palpation is of inestimable value in surgical work.

I am convinced that the physician often fails in his abdominal and vaginal examinations to secure as satisfactory results from palpation as he might if he were to insist upon better relaxation of the abdominal walls on the part of the patient. The first step in the routine palpation should be directed to the state of the abdominal muscles, and no sudden or painful manipulation should be made until, after coaching the patient in letting his muscles relax, one has secured his complete confidence and co-operation in procuring the best possible degree of flaccidity of the abdominal walls. Then, and not until then, may attention be directed to the condition of the internal organs, insisting at all times throughout the examination upon this relaxation. Oftentimes the findings, which are perfectly plain under these conditions, may otherwise be difficult or impossible to detect, as for example; the moderate grades of local rigidity of the abdominal walls, small or deep seated abdominal growths, enlarged gall-bladder, etc.; and in the bimanual vaginal examinations, the detection of the fundus of the uterus, the ovaries, the outlines of growths in the pelvis, their degree of mobility, etc.

It is common practice to have the patient flex the knees for abdominal examinations, but as a rule I find that this entails some muscular tension on the part of the patient, and that better relaxation can be had with the limbs flat on the bed or table.

#### KIDNEY PALPATION.

A floating kidney will sometimes fail to be detected by the usual examination in the dorsal position, but may be readily identified if the patient is turned over so as to lie on the side opposite to that of the examination, with the thighs slightly flexed, or if he is placed in the sitting posture with the body inclined forward and the elbows resting upon a table to secure abdominal relaxation. The explanation of this rests in the fact that at times the kidney is so placed in its bed that it must first be displaced inward and forward before it can descend.

#### COSTAL ARCH RIGIDITY.

The value of the information received through

\*Read before the Aesculapian Society of the Wabash Valley, May 28, 1913.

the act of compressing the costal arches and the lower ribs is a point that is not generally recognized. With the flat of the hand placed over the costal arches, one on each side, alternate compression and relaxation are symmetrically made, noting the comparative degree of resistance to the act on the two sides. Normally the resistance is greater on the right side on account of the liver. Undue resistance will be noted on one side, however, in enlargements, growths, or exudates of the liver, stomach, spleen, etc. Resistance plus tenderness will be noted in inflammatory conditions, as sub-diaphragmatic abscess, abscess of the liver or the spleen, etc. Traumatic rupture of the liver or the spleen will give tenderness, with or without resistance.

#### LOCALIZED TENDERNESS. "PENCIL" TENDERNESS.

In estimating the condition of localized tenderness in surgery, there is a very simple procedure by which these examinations may be made to elicit very much more definite information than can be had by the usual pressure of the hands or the fingers. The method is so simple and so accurate in the detection and the clear cut localization of the tenderness, that it is a surprise to me that it is not described in the text-books and that it has not become a part of the routine method of surgical examinations in general practice. All that is required for this examination is a common lead pencil with a rubber eraser at the end. The examination is made by placing the pencil perpendicular to the part to be examined, with the rubber end in contact with the skin when, after gaining the patient's confidence and co-operation in announcing the degree of pain on pressure, the pencil is firmly pressed down upon the point of contact. A point a quarter or a half an inch from this spot is next examined with the same amount of pressure, and the comparative degree of tenderness elicited is noted. This is repeated at various points covering, in a more or less symmetrical manner, the entire area of the sensitive region. The distinctness with which the outlines of a true surgical local tenderness can be mapped out and limited by this method will be a revelation to those who have never applied the test. For example, a tenderness in appendicitis which by palpation is located over an area of say 2" x 4" may, by this means, be distinctly localized to an area of about 1" x 2". Not only are the limits of the pathology thus more clearly defined, but the contrast between the sensitive and the normal areas is very much accentuated by this test. In other words, the sum total of the tenderness found on palpation always consists, to a certain extent and

sometimes to a large extent, of the pain induced by the displacement or the crowding of the surrounding organs or tissues against the point of disease, or of the sensitiveness due to the manipulation of the overlying soft parts. The tenderness from these factors is reduced to a minimum in the examination by this method. If a contused extremity be grasped and squeezed in the full hand, considerable pain will be induced, whereas, local pressure of the pencil, even though it be sunk deeply into the contused area, will, on account of the absence of the tissue crowding, produce practically no pain. If, however, in pressing over a contused area, the pencil comes down upon the line of a fracture of a bone, or upon the point of rupture of a ligament, very decided and definitely localized tenderness will at once be evident.

The practical application of this "Pencil Tenderness Examination" finds its most valuable use in the early detection of appendicitis, at the time when it is most important and most difficult to differentiate a simple bowel disturbance from a beginning appendicitis. The indefinite sensitiveness here, under the pencil test, seems to disappear in the former case, and to become concentrated at the appendix in the latter.

Not only is the detection of doubtful fractures greatly facilitated, but the actual line of the fracture can often be very clearly demonstrated by this test. For fractures of the small or the superficial bones it is desirable to cut the rubber end into a flattened edge for more definite localization. The differentiation between a ruptured ligament and a simple strain of a joint will usually be very evident on the application of this test, as will also the differentiation of simple contusions of the scalp from those accompanied with fracture of the skull.

#### AUSCULTATION OF FRACTURES.

The examination of fractures by auscultation of the bones is a point of limited utility, possibly, still it is one that has distinct merit in the detection of fractures, as well as in the determination of the state of progress that is being made in the healing of a fracture. With the stethoscope placed over one end of the bone and a tuning fork over the other, the sound vibrations will be transmitted to the ear in normal bones and in bones in which osseous union has occurred following a fracture. These sounds will, of course, not be heard if the bone is the seat of a fracture that has not yet united. The clavicle is peculiarly located so that this test may be utilized without the aid of the tuning fork. On placing the stethoscope over the acromial process of the clavicle very distinct bron-

chial breathing is to be heard normally. If the clavicle becomes fractured these breath sounds disappear from that side, and when bony union has been established they will again appear.

This test, where applicable, may well be used as a routine observation in the healing of fractures, as the sound conduction will return, if progressing satisfactorily, long before one would care to risk the manual test for false motion. In the case of the clavicle the beginning return of the breath sounds may be heard as early as two weeks, from which time on they usually increase to the normal at the fourth or fifth week.

#### JOINT PALPATION.

In the examination of surgical conditions of the joints it is of the utmost value in the symmetrical palpation of the bony relations, to keep the joint gently rocking back and forth, through passive flexion and extension, or rotation, as the case may be, throughout the examination.

### WHAT ARE CONTRAINDICATIONS TO THE OPERATION FOR THE RADICAL CURE OF GASTRIC CANCER?

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NEW YORK.

At the present day most lay people are cognizant of the utter futility of the medical treatment of malignancy; and when one considers the enormous prevalency of cancer and the appalling frequency with which the gastro-intestinal tract, particularly the stomach, is affected, we naturally conclude that some more decisive and helpful means must be employed to reduce the very large mortality.

Today we have but one such help more reliable than any other and that is surgery. When surgery is mentioned, however, I wish to emphasize the choice of the surgeon, because the operation for a radical cure is dependent upon good judgment and good technic.

It will indeed be utopian when the surgeon can be dispensed with and the cure left to the successful employment of sera or other chemical methods, but up to the present we have nothing short of surgery to attempt a radical cure. Having made a probable diagnosis of malignancy by the employment of all the diagnostic methods at our disposal, the patient must be persuaded to consent to immediate operation provided there are no contraindications.

Wm. Mayo says, "From my experience cancer, as cancer in the stomach, does not produce symptoms upon which an early diagnosis can be made. Only when its situation makes a palpable tumor mass or produces obstruction can a probable diagnosis be established."

We have at times seen patients who present almost every symptom with the exception of a palpable tumor, whom we morally feel have malignant disease and should be immediately explored. Such patients many of us persuade to be operated upon. There are always some colleagues who are extremely hard to convince and who absolutely refuse until they can palpate a mass, which by that time may be of considerable size and may have already formed metastases so that a radical cure is improbable. It is fortunate that the latter type of physician is diminishing in number owing to the assistance derived from the Roentgen ray examination.

When we consider the contraindications to an operation for the radical cure we find that there are but few, namely, a diagnosis made late in the disease; the presence of metastases or extension into neighboring organs; marked debility of the patient; the presence of some accompanying severe organic disease, *e. g.*, of the heart, arteries, kidneys or lungs; some marked constitutional disease, as diabetes mellitus.

Heretofore the finding of a tumor indicated an inoperable condition; this is a mistaken idea. The size of a tumor is less important than is the presence of adhesions. I daresay there are many surgeons who can recall some cases in whom at operation very extensive infiltration was found, the tumor mass and glands were excised and the patients continued to live for several years afterwards, apparently well.

It was my good fortune last winter to see in Vienna a patient from the Hochenegg clinic, seventy-two years of age, upon whom fourteen years previously a complete gastrectomy was performed for malignancy. It was indeed a pleasure to see the patient, the excised stomach and the radiographic pictures of the present esophageo-intestinal union.

One of the large bugbears in considering operation is the condition of the lymphatics. Mayo lays particular stress on this when he says that "the physiologic function of the lymphatics is a most important factor in relation to the radical cure of carcinoma. The stomach is generously supplied with lymphatics and gives the smallest percentage of radical cures. The pyloric segment has nine-tenths of all the lymphatics of the stomach."

Enlarged lymph nodes will be found in a high

percentage of cases but they are not always malignant. Mayo advocates that "when the disease in the stomach is mechanically removable and infected glands exist that are not removable, a resection should be done if the patient is in fair condition. It gives such patients generally some comfort for one to two years. Moderate involvement of the pancreas does not preclude operation."

The assertion recently made by some clinicians that the presence of lactic acid was a contraindication to the operation for a radical cure is in all probability going a little too far and it should be ignored. Experience has taught us otherwise.

The presence of a more or less continuous fever serves for some as a contraindication. The temperature curve may show marked irregularity, in other cases it may assume an intermittent character. The rise of temperature in malignancy may be due to toxic absorption or it may indicate the presence of complications.

From October 1, 1897, to October 1, 1912, the Mayos performed 1,498 operations for carcinoma of the gastro intestinal tract, of which 996 involved the stomach. Of these 996 it was possible to do the radical operation in only 344, or 34.5%. Taking into consideration that the initial recoveries, according to Mayo, are in the vicinity of 90% and that these patients are given a chance of permanent cure approximating 25%, it seems incumbent upon us all to make every effort toward an early diagnosis and immediate operation.

Weil in a reference stated that at the Breslau surgical clinic, 157 resections were performed during the last five and one-half years, of which 135 were for carcinoma. Of the 101 who survived the operation and its sequences, 40 are still living, in some of whom the operation was done more than five years previously.

The patient in whom a cancer of the stomach has been diagnosed, should not be treated with pessimism and skepticism as to the result from an operative interference, for one is occasionally very agreeably disappointed. Every operation for cancer of the stomach always begins as an exploration inasmuch as all gastric cancers present features of uncertainty until the abdomen is opened; for only then is it possible to decide whether the operation to be employed is for a palliative or curative purpose.

Every patient should be given a chance since cancer of the stomach is recognized as a disease which in the present state of our knowledge is only removable by early removal. Delay in establishing a diagnosis and delay in surgical interference serve

as very strong contraindications to the operation for a radical cure.

### BISMUTH PASTE AS A PRIMARY DRESSING FOR SKIN GRAFTS, AND IN THE TREATMENT OF BURNS AND GRANULATING WOUNDS.

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The multiplicity of dressings for skin grafts tends to prove that our results, either immediate or remote, are not entirely satisfactory and leave much to be desired in comfort to the patient, in celerity of healing and, eventually, in the viability and pliability of the scar.

In this age of promiscuous surgery, the personal equation becomes a strong factor. The tyro does not hesitate to attempt the simple (sic) operation of extensive skin grafting with the only too frequent result of merely increasing the patient's suffering by giving him an additional disabling wound of the thigh, or of such other part of the body from which the graft was removed. Let us omit any mention of the mental and physical distress of the friend or relative who so nobly, and uselessly, plays the part of donor.

An ideal dressing for Thiersch skin graft should satisfy certain requirements, namely:

- (1) Secure splinting of the graft to its new bed.
- (2) Elimination of surface exudation or its rapid removal.
- (3) Stimulation of epithelial proliferation.
- (4) Comfort.

The more popular forms of dressings satisfy some of these qualifications, but each has objectionable features which nullify, to a great extent, its own peculiar advantages.

Rubber tissue has long ruled as favorite, and in expert hands, it proves very effective. Success is due more to the clever cutting of the grafts and to good technic, however, than to the dressing itself. This also holds true in all other forms, for no dressing has as yet been devised which is absolutely "fool proof." The objections to rubber tissue are apparent. Even with drainage holes provided, the excretions are dammed back so that the newly implanted graft is either floated away from the surface, or else becomes macerated leaving few, if any, surviving cells.

Dry gauze is objectionable, for the graft tends to cling to its meshes rather than to the underlying

surface, and is apt to be removed in toto at the first dressing. To overcome this defect the gauze has been applied damp and kept in this condition by constantly wetting with salt solution. This requires a great deal of attention, and if, perchance, the under surface does become dry, failure results. Moreover, too assiduous wetting causes maceration.

Granting the advantages of the open air method under ideal conditions, the objectionable features are many. Primarily, the grafts are apt to be disturbed during the restlessness of the patient while recovering from the anesthetic. Subsequently the exudations become dried and caked, covering the surface with an unsightly mass, beneath which increasing excretions are endeavoring to find avenues of escape,—a mass most difficult to remove, of offensive odor, and far from conducive to the comfort of the patient, whose well being we particularly desire. A carefully constructed screen must also be used to protect the wound from contamination by flies and dust.

Having experienced these disadvantages, and in the hope that I may offer a solution to some of them, I shall briefly review the ideal technic of skin grafting by the Thiersch method, and submit a dressing which has given such complete satisfaction over a period of more than two years that I now depend upon it entirely.

As it is essential, or at least most desirable, that the body forces should be at their best, we should not attempt to skin-graft a patient debilitated by long confinement in bed, necessitated by the original burn or injury. Suitable hygienic and dietetic measures should be employed until his physical condition is comparatively restored. During this time especial attention should be paid to the wounded area so that the granulations may become strong and healthy. On the night before operation the thighs are thoroughly cleansed and dressed with sterile towels. Under the anesthetic the wounded area and the thighs should again be cleansed with very hot salt solution. As it is most important that no antiseptic solution be brought in contact with the body of the patient, the hands of the operator or assistants, it is a wise precaution to have all such solutions removed from the room. The exuberant granulations are now removed with a dull curette or the surface freshened by vigorous rubbing with dry gauze until there is free bleeding. The area is then covered with a towel, wrung out of very hot salt solution. This is kept in place, to be removed only as the grafts are transferred from the thigh. These grafts should be so thin as to be translucent. The tendency to cut them too thick

may be partially obviated by using a regular heavy skin-graft razor, which is flat on the under surface and concave on the upper. By a quick, sawing motion the desired graft is removed, leaving an area dotted with pinpoint bleeding, which will heal promptly and does not incapacitate the leg. The grafts thus obtained are laid evenly upon the granulating surface, underlying blood and air bubbles being carefully removed, and then pressed firmly into place by means of a gauze sponge wrung out of hot salt solution. The dressing is then prepared and applied in the following manner:

Strips of gauze, six to eight layers in thickness, are thoroughly impregnated and *buttered* with sterile 33 1/3% bismuth paste (Beck's paste). These are laid directly over the newly implanted



Fig. 1. Appearance of grafts three weeks after operation.

grafts, smoothly and in order, extending for two or more inches beyond the area of the wound. No wrinkles or folds should be permitted to remain. Over these there is placed a layer of absorbent cotton, and the whole dressing held firmly in place by a roller bandage.

The first dressing should be done on the fifth day and at this time, especially, does success depend upon the skill and care exercised in the removal of the primary dressing. A similar dressing is re-applied and subsequent dressings done on every third or fourth day as the case requires. At about the fifth dressing one is able to peel from each graft a thin film of dead cuticle, leaving a firm, pink healthy graft in position, whose edges are already rapidly advancing to join those of its neighbors.

The advantages of this dressing may be best

appreciated by trial. In my opinion, it approaches more closely to the ideal than any other form. The grafts are held firmly in place; exudation becomes almost negligible; there is stimulation of the proliferation of the epithelium, not only from the edges but also from the deeper surface, that exceeds by far the effect produced by Scarlet R. and lastly the patient expresses a sense of comfort frequently absent in the other types. The resultant scar is soft and pliable, and shows no tendency to break down. The accompanying illustrations represent the first case on which I tried this method over two years ago. Although a very intractable boy, who made no attempt to forward efforts on his behalf, but who, on the contrary, retarded every endeavor directed toward his recovery, the results in his case



Fig. 2. Seven weeks later. Contracting bands on throat cut and foreskin implanted in left angle.

were so eminently satisfactory, that I have clung to this procedure to the exclusion of all others.

The boy received his burn on November 9, 1910. While playing about a bonfire one of his playmates threw a can of gasoline over him and pushed him into the fire. He lay in the hospital betwixt life and death for seven months. The burn extended from his chin to below the umbilicus, involving two-thirds of the circumference of his body. He was being treated by an open air method and the stench was intolerable. When the piled up crusts were removed with olive oil, his screams disturbed the entire ward. My first efforts when I took charge of him were directed toward increasing his bodily resistance and to get the wound in condition for grafting. On June 5, 1911, I did the first

operation, using as a dressing both rubber tissue and wet gauze. At first all appeared favorable as the grafts had taken well, but gradually they "evaporated" leaving the wound as extensive as in the beginning.

It was during this interval that I began to use bismuth paste as a dressing for the granulating wound. Immediately the whole area changed for the better. The abundant exudations diminished rapidly, the granulations became firm and healthy, and the surrounding edges began to advance. This may be observed in illustration No. 1, particularly at the lower border of the wound. I then decided to graft again, using bismuth paste as a primary dressing. The result was as I have previously described. Illustration No. 1 shows how the grafts appeared three weeks later. It may be observed that although the grafts were originally separated by an inch or more, in many places they have already fused, either with their neighbors or with some part of the surrounding border. Their healthy pink color and their thickness cannot be well appreciated from the picture. The second illustration shows the condition seven weeks later, after the contracting bands in the neck had been cut and his own foreskin had been implanted in the left angle.

The action of bismuth paste, when used in the treatment of this large granulating surface, was so noticeably beneficial that I have since used it as a routine measure in all granulating wounds. I use it as a primary dressing in burns, when it is not possible to follow Rovsing's method, and always as a secondary dressing. Its action is mildly antiseptic and astringent and in cases where I have used it in conjunction with Scarlet R. on the same patient it excels the latter in the stimulation of the growth of epithelium.

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#### TO PREVENT TETANUS INFECTION.

The first and most important lesson which both physician and layman must learn is to open widely all wounds of the kind which could have carried dirt from the surface into the deeper parts. We should not content ourselves with cleansing or disinfecting the surface around the point of entrance of the blank cartridge, nail, etc. This will do no good whatsoever. The germ of tetanus grows best in closed cavities and we must open the door widely and remove all of the foreign material and sloughs. —DANIEL EISENDRATH in *The Chicago Medical Recorder*.



REPORT OF CASES ILLUSTRATING  
INTRACRANIAL COMPLICATIONS  
IN PURULENT MIDDLE EAR  
DISEASE.

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The great importance of these complications, and with the high mortality following them, is my reason for publishing the following case reports.

The intracranial complications of purulent middle ear disease are thrombosis of the sigmoid sinus, epidural abscess, suppurative labyrinthitis, meningitis, and cerebral or cerebellar abscess.

CASE I:—Miss A. M., 13 years of age, contracted influenza two weeks ago; four days ago her left ear became painful, a day later a bloody discharge from that ear appeared spontaneously, which became sero-purulent within a day. When I saw her for the first time on May 5, 1909, she suffered from a typical purulent otitis media of the left ear, the drum being perforated in the posterior lower quadrant and not bulging to any extent. No pain on pressure over antrum or mastoid tip. Temperature and pulse normal. At the same time she had symptoms of an acute rhinitis and pharyngitis, no sign of accessory sinus suppuration.

May 22nd, 1909. Ear is practically dry, perforation had not closed yet, pharynx still looked congested.

May 30th, I was called to her home where she gave the following history. For two days she had had headache, had vomited a few times, and felt somewhat drowsy. The discharge had reappeared to a slight extent; drum not bulging; upper posterior meatus not edematous. Mastoid bone painful on pressure. Pulse 108, temperature 103.5°.

She was transferred immediately to the German Hospital where I did a mastoidectomy at 1 A. M., May 31st. The operation disclosed an acute otitis, the bone bleeding very freely, but no pus.

The sinus was slightly exposed and looked normal. The temperature dropped immediately to 99.2° and rose within the next twelve hours to 105.6°. For the next five days the fever curve ranged between 101.5° and about 104°. The Widal reaction was negative. The differential blood count showed on June 5th, w. b. c., 18,700, poly 92%; small lympho., 8%. June 6th, w. b. c., 19,500, poly 88%, small lympho, 8%. June 7th, w. b. c., 18,800, poly 70%. Small lympho. 12%.

Spleen slightly enlarged. No chills, no sweats, no headache, no vomiting, no Babinski and slight Kernig reaction, no opisthotonos. Labyrinth functioning.

On the afternoon of June 7th I explored the wound by exposing the dura in the middle fossa, which looked absolutely normal and not bulging. I exposed the sinus from the region of the bulb upward for about one inch. It looked absolutely sound and felt normal, and after compression filled right up again. After the operation the tempera-

ture rose to 106°, and after ranged between 102° and a little above 104°, the pulse being a little more frequent. There were none of the classical signs of meningitis. On the afternoon of June 9th, she vomited some yellow matter, on the 10th she became slightly delirious and vomited a few times; on the 11th she became comatose with tetanoid motions. Lumbar puncture showed fluid under slight pressure, slightly turbid, containing pneumococci. Lumbar puncture was repeated the next day. On the 13th the patient died.

Autopsy:—Brain shows a fibro-purulent meningitis near the bone, some pus in the meshes of the pia, dura not very distended. Mastoid wound looks healthy. Sinus filled with a post-mortem clot. Frontal sinus contains a little muco-purulent secretion.

The question of the relationship of the meningitis to the acute ear infection remains unanswered, as there is the possibility that the meningitis might be simply an independent complication of the same infection. There is also the possibility that the infection might have come from the frontal sinus or the nose. In future in a questionable case, I shall make an early lumbar puncture for diagnostic and prognostic purposes.

CASE II:—B. M., 22 years of age, hatmaker, without inherited or acquired disease; suffered since early childhood from a discharge from the left ear, following as nearly as he can remember an attack of influenza. For six months he felt a fullness in the left half of his head, accompanied occasionally by pain and slight vertigo. He was treated for some time in a dispensary where he got only very slight and temporary relief.

On October 17th, he came to the dispensary of the Har Moriah Hospital. He had then a decided diminution of hearing in that ear. Conversational voice heard at six feet. The caloric test showed a reasonable functioning labyrinth. There was no nystagmus, except a slight spontaneous one, when looking toward the affected ear.

Examination of the left ear shows a large fibrous polyp filling the whole meatus, so as to prevent a more detailed examination of the middle ear; therefore, I removed the polypus with a small ring knife, bearing in mind that such polypi are often attached to the dura in the presence of a defect in the tegmen tympani. I did not use a snare as I should have had to pull rather forcefully on account of the firmness of the polypus. The removal of the growth was accompanied by copious bleeding, therefore I inserted a tampon of sterile gauze and examined him the next day after removing the blood clot under sterile conditions without washing. I found that the drum had disappeared with the exception of a part of the membrana flaccida. There was no trace of the ossicles, the rest of the polyp being attached somewhere in the attic. Patient felt very much relieved until the night of October 10th, when he felt chilly, vomited, and had an agonizing frontal headache. When he was brought to the hospital, he had a temperature of

101.5°, frontal headache, nausea, vertigo, slight stiffness of the muscles of the neck, Babinski and Kernig signs doubtful; spontaneous nystagmus not present. Lumbar puncture done immediately. The fluid was turbid and under pressure. A smear was negative.

The fluid was reported by the Rockefeller Institute as sterile, containing 89% of polynuclear leucocytes. One hour after reception the patient had a chill and his temperature went up to 103°. The same night 15 cc. of spinal fluid were removed by lumbar puncture and the same amount of Flexner serum injected. On October 23rd 30 cc. of fluid were withdrawn and the same amount of Flexner serum injected. As the patient now developed the typical Babinski and Kernig signs, and opisthotonos, and his pulse was very slow, 30 cc. were again removed at midnight. On October 24th, the temperature still ranged between 101° and 102.5°; his meningeal symptoms slightly improved. On October 25th, 30 cc. were removed again, the fluid much clearer and under less pressure. A blood culture was negative.

On November 6th the patient being in good condition I performed a radical operation (Schwartz-Stacke) to remove the cause of his meningitis. I found the bone driven into the region of the tegmen tympani up to the dura, which was covered with granulations which bled so freely that I had to use adrenalin to control this. After the operation all the symptoms of meningitis disappeared rapidly and the patient was discharged, the ear still showing some purulent discharge from the region of the junction of the tympanum and antrum.

Three months later the patient returned to the hospital after an attack of gripe with a severe headache and slight fever. The ear was still discharging, showing the bacillus proteus. Mastoid not painful. Differential blood count shows a gradual increase of the leucocytes and polynuclears. After a lumbar puncture, which was dry, the patient had a chill and after that a decided septic temperature with a chill every other day. Caloric test absent on the affected side. Lumbar puncture shows almost pure pus. Two days later, exposure of labyrinth revealed a fistula in the horizontal canal. No discharge of fluid or pus. The patient died three days afterward with symptoms of diffuse purulent meningitis.

As an autopsy could not be obtained, we have to try to explain the case by its clinical symptoms. In all probability the patient developed, after the removal of the polyp, a circumscribed labyrinthitis, producing a toxic meningitis by osmosis of the toxemia through the dura. After the subsidence of acute symptoms, the suppurative labyrinthitis continued and later caused a diffuse purulent meningitis, but as I did not find pus in the labyrinth at the time of the second operation, this explanation may not suffice. Another possibility is that the symptoms of meningitis were the initial stage of a beginning brain abscess which, after the disappearance of the acute symptoms continued in the latent stage, without much pressure symptoms, and started to cause symptoms again, when it broke

into the ventricle and caused a general diffuse purulent meningitis.

CASE III:—Mr. A. M., 45 years of age, married, insurance inspector of the State of New York. Gives no important data in his family history. Had the usual diseases of childhood. When five years old, scarlatina complicated by some affection of the left ear, which discharged pus ever since. At no time did he receive any treatment for this affection. I saw him for the first time in the last week of October, 1909. He complained then of a slight dizziness and an occasional headache on that side. Temperature and pulse normal. No spontaneous nystagmus. Labyrinth responds normally to caloric tests; hearing somewhat diminished. Inspection shows a drum with a large marginal perforation, granulations protruding through the defect in the drum interfering with drainage. The granulations shrunk under treatment; his headache and dizziness disappeared. In spite of treatment the symptoms recurred about the end of November. On December 4th he took a trip to the seashore on a rainy day, and on his return trip felt thoroughly chilled and experienced a sudden boring pain in his left temporal region. He immediately came to me. I could not find anything out of the ordinary and prescribed aspirin with instructions to keep me informed about his condition. I did not hear from him for four days. I was then called by his family physician, who had been treating him for an attack of gripe. He gave me the following history.

The patient had a chill the preceding night, the temperature going up to 102°, by mouth. He had vomited a few times and felt dizzy, seems to lose his memory and complains of a diffuse headache. When I saw him he looked rather sick, his tongue very much coated. Reflexes normal, no nystagmus, caloric tests show a functioning labyrinth, so does the turning test. There is no localized tenderness on percussion of his head. When showing him objects he thinks a little while before naming them; once in a while he makes a mistake but corrects himself immediately. Inspection of the ear shows a gray exudate covering the granulations, due to an acute infection. I suggested a blood count and suggested the possibility of an epidural or cerebral abscess. The next few days the doctor notified me of a general improvement in the symptoms of the patient. But four days later the temperature went up again to 102° and the patient became slightly delirious. When I saw him at that time he had practically the same symptoms as on my last visit, but I found a complete aphasia. He called nearly every object shown to him, water. I insisted on an immediate blood count which was done by Dr. L. Heitzman and showed 34,000 w. b. c. and 88% polys.

Diagnosis of temporo-sphenoidal abscess with a meningeal involvement was made, and after consultation with Dr. F. Whiting, who confirmed the diagnosis, the patient was removed to the German Hospital, where I operated upon him December 14th. I did first a typical Schwartz-Stacke operation. I found pus squirting from the region of the tegmen antri and, when the dura was exposed—

pus rolled out from the epidural space. I then removed a piece of bone as large as a 25 cent piece from the squamous portion of the temporal bone, one shank of the bone forceps in the cranial cavity, the other in the mastoid process. After the removal of the tegmen tympani I saw in that location a gangrenous spot in the dura through which a few drops of pus followed. A knife pushed into the brain for about  $3\frac{1}{2}$  cm. did not increase the flow of pus, but when a needle was pushed in the pus began to pulsate out. A flat draining forceps was inserted alongside the needle, the fistula dilated, and a rubber tube inserted for drainage. The pus contained bacilli proteus. The operation lasted  $1\frac{1}{2}$  hours, the patient rallied well and for five days the temperature ranged between  $100^{\circ}$  and  $101.5^{\circ}$ , his aphasia persisted but headache disappeared. Blood count showed 36,000 w. b. c., 82% polys.

On the 6th day, when I changed the dressing it was apparent that he had a gravitation abscess in the neck. This was incised and drained. After that the polynuclears were 78%. The brain wound still discharged pus and macerated brain tissue. The patient gradually became more and more apathetic; a facial paralysis developed on the opposite side. In spite of repeated attempts I could not locate a secondary abscess, and on the 12th day the patient became comatose and died, with all the clinical symptoms of meningitis. Unfortunately I did not succeed in getting permission for a post-mortem examination.

At the time I saw the patient in October, when he complained of headache and slight dizziness, he was in all probability suffering from an epidural abscess.

On December 4th, when he had the chill and sudden pain the pia mater became involved and became adherent to the dura and the pus broke into the brain. In other words he then had meningeal symptoms of the initial stage of brain abscess. The secondary stage lasted only a few days, when the third stage with posture symptoms made its appearance. The high blood current and the temperature showed that there was a co-existing meningitis, which made the prognosis in this case very unfavorable from the beginning.

CASE IV:—M. R., 43 years of age, seen in my office November 10th, 1910, gives the following history: About two weeks before he had pain in his left ear, which had previously been opened somewhere else. Ever since his ear feels full and he cannot hear the ticking of the watch and whispering. The drum looks purplish and thickened and is retracted. Catheterization gave him immediate relief and improved his hearing.

December 7th, the same condition still persists; treatment gives but very temporary relief.

December 13th, he returns stating that after some pain in the ears he noticed a slight discharge which comes from a small perforation in the anterior lower quadrant.

December 18th, ear is dry.

December 28th, he returns complaining of severe pain in the ear which has persisted now for three days. Temperature  $100.4^{\circ}$ . Drum swollen and

edematous. Enlargement of the paracentesis opening.

December 29th, temperature  $103^{\circ}$  after a slight chill, unbearable headache; pain on pressure over mastoid. He is transferred to the German Hospital for examination. Temperature rises during the night to  $105.4^{\circ}$ . Differential blood count shows 18,000 w. b. c. and 82 polys.

December 30th, mastoid inspection discloses very little at fault in the mastoid process, sinus is explored and found normal. Dura is explored and found normal. Nothing found to explain the high temperature.

December 31st, after operation temperature falls to  $100.2^{\circ}$  and rises in the evening to  $101.2^{\circ}$ ; some vomiting, pulse only 72 and slightly irregular.

January 1st, patient still vomits, temperature practically normal. After that he feels better, complains still of some headache.

After five days wound is dressed and seemed to be in good condition. He leaves the hospital on January 2nd, to be treated at home.

January 18th, while in my office, he points to a glass and asks for a drink of water; he cannot name the glass. There is still some discharge of pus from the aditus and antrum. He is put to bed and watched for a few days, during which time the aphasia disappears. Wound still shows a discharge from the aditus.

February 13th, he has a recurrence of his aphasia with a decided headache.

Examination at that time shows:

Amnesia aphasia: words are heard and understood. Words are seen and understood. He does not write well at dictation, but copies properly. Reading is poor. He shows therefore amnesia-aphasia, some degree of agraphia, some degree of alexia.

Diagnosis of abscess of temporo-sphenoidal lobe was made and as the symptoms seemed to depend on the amount of pus draining through the aditus, and that amount being too great at times to come only from the tympanum, I made the diagnosis of a temporo-sphenoidal abscess draining through the tegmen tympani.

February 14th, patient returned to the hospital where a blood count showed only 9,600 leucocytes, 78% polys.

February 15th, operation. Old wound curetted, tympanum exposed according to the Schwartze-Stacke. tegmen tympani curetted away, showing a fistula leading into the brain through which about one ounce of foul pus oozed out; broad bladed forceps inserted and fistula dilated. The former median incision is now extended curving around the upper insertion of the auricle, a piece of bone is now chiseled out of the squamous portion of the temporal bone, the exposed dura is incised by a cross incision and the brain incised until the knife meets the probe in the abscess cavity, which has been entered from the tympanal side. An iodoform gauze drainage inserted.

The patient's condition for the next two days was fair, then his temperature went up to about  $104^{\circ}$ ; blood count 20,000, 90% poly. Lumbar

puncture shows turbid fluid. Cultures show *bacillus pyogenes longus lanceolatus*. Patient died February 18th. Temperature 106.5°.

The high temperature which induced me to do the first operation, and repeated vomiting and decided headaches are very likely to be symptoms of the initial stage of the developing brain abscess. It would have been perhaps wiser to go into the tympanum at the time when I did not find an explanation for the clinical symptoms during the mastoid operation. The patient then entered upon the latent stage of the abscess, which lasted sixteen days, after that he gave the first signs of the tertiary stage by aphasia, which was observed through the fact that the free drainage of the abscess through the tympanum caused at times complete disappearance of the symptoms. He finally died of a purulent meningitis. The blood count was interesting as it shows how little absorption takes place in the brain itself, first being almost normal; when the meninges are involved it shows the immense number of white blood cells and poverty of the polys. The blood count is therefore of a decided prognostic and diagnostic value.

CASE V:—P. B., Austrian, workingman, age 37. Underwent elsewhere an intracranial operation about the 15th of November. Two days later pain in his left ear; a day after appearance of pain, paracentesis. On December he appears well with only a moderate discharge from the ear.

December 4th, temperature goes up to 104°, he complains of a headache on the left side. No nystagmus, opisthotonos, no Kernig. No mastoid tenderness. Perforation in the lower posterior quadrant of the drum, through which a slight discharge of pus (not much pressure) can be seen. There is no sinking of the upper posterior meatus.

December 6th, a differential blood count shows 15,800 w. b. c. 90% poly. Temperature down to 100.5° in the morning. At three P. M. 102.6°.

December 7th, pain in right knee. Temperature up to 106°. Mastoid operation, sinus exposed and immediate bleeding from both sides.

December 9th, aspiration of knee joint shows pus cavity; streptococcus. Temperature up to 104°. Knee joint washed with subnitrate. Patient working. He continues in same condition up to December 21st. A blood culture at that time shows streptococæmia. He developed now a melanosis in right infrascapular region. Sinus is now exposed almost down to the bulb; still bleeding from above. After careful removal of clot from below some purulent material exudes from the region of the bulb. Previous to manipulation of the sinus I had ligated the internal jugular, which was perfectly sound and not thrombosed. In spite of my efforts his general condition continued unfavorable.

On December 24th, I lifted the upper end of the ligated jugular into the wound, removing clots and introducing a soft rubber tube into the vein, for better drainage; the same is done from above pushing a soft rubber tube almost into the bulb, washing through the bulb from above.

December 28th, blood culture still persists. Mastoid normal, and sinus looks well. Knee aspirated

again; it contained six ounces of pus. Patient became delirious and died on December 29th.

CASE VI:—Clara F., 48 years of age, widow, had an attack of grippe Dec. 16th; four days later pain in right ear.

On Dec. 26th, I saw her for the first time, found an acute purulent otitis media; paracentesis done immediately.

January 7th, 12 days later she presented herself in my office with a temperature of 101.5° and a history of two chills within the last three days. Pain on pressure over antrum and tip. Proper drainage of bone pus.

January 8th, mastoid operation. Bone bleeds properly, no free pus in cells on antrum.

January 9th, temperature around 100° in the evening. Following a chill temperature went up to 105.2°. Blood culture tube shows after 36 hours streptococcus. Differential blood count 22,000, polys 87%. Exposure of sinus from knee to knee, careful incision of bulbar end results in free bleeding from below, no bleeding from above, where the sinus wall is of a dirty grayish color; exposure of the sinus further back until it looks normal; splitting of the sinus results in a sudden gush of blood. Jugular vein is ligated and found not to be thrombosed.

January 13th, face on the side of jugular ligation swollen and cyanotic, patient rather restless and not quite rational.

January 14th, temperature up to almost 104°, blood cultures still positive; differential blood count 20,000 whites, 75% poly. Dressing removed, shows the neck wound clean. Sinus incision closed; in an attempt to reopen it free hemorrhage from above.

January 16th, temperature up to 103°.

January 17th, temperature ranges from 100.2° to 100.8°. Blood culture is now negative.

January 27th, temperature ranges around 100°, patient doing well; shows a slight exophthalmos on the ligated side. Patient discharged as cured after two months. Cyanosis and exophthalmos have disappeared.

57 W. 90TH ST.

#### PREPARATION FOR LAPAROTOMY.

It is a mistake to diet a patient too severely. Many a naturally strong patient has been so strictly dieted and so severely purged before operation as to be brought to the operating-table almost on the verge of collapse. The patient should be allowed to eat almost *ad libitum* up to and including the evening meal the day before the operation. A moderate dose of castor oil or liquid albolin given the night before and a properly given enema—preferably of soap suds—ought to be sufficient to put the bowels in proper condition.—THOMAS B. EASTMAN, in *The Journal of the Indiana State Medical Association*.

## MILITARY SURGERY.

GUSTAVUS M. BLECH.

CHICAGO.

## GUNSHOT WOUNDS OF THE CHEST.

Of greatest practical interest to us appears the region of the chest, not so much because it contains organs of vital importance—lungs, heart, large blood vessel, mediastinum, esophagus—but for the fact that, aside from the immediately fatal injuries, wounds logically should place the recipient hors de combat, produce no important symptoms, at least not at once, so that the patient labors under an illusion of a slight injury, while in reality he is but entering the road of serious disease if not of permanent invalidism.

For this reason it is imperative that each surgeon, including those in civil life, should be thoroughly familiar with the immediate and remote effects of wounds of pleura, lung and esophagus, and know what can and should be done to achieve the best possible therapeutic results.

The *soft parts* of the chest, when injured without involvement of deeper structures, irrespective by what kind of missile produced, require no other treatment than that which has been prescribed for soft parts elsewhere, for these wounds do not especially differ from like injuries elsewhere, the control of hemorrhage and the prevention of infection by the application of a regulation dressing is all that is required.

*Hemorrhage of the intercostal vessels*, though it is difficult to conceive an injury of these vessels without involvement of one or more ribs if not the lung itself, requires more energetic treatment. At the frontal aid stations, when time is pressing and dressing material limited, simple firm tamponade will be all that can be done. But whenever possible—and this is very often to be the case at the dressing stations proper—tamponade after the method of Langenbeck still remains the most efficient means of controlling this troublesome form of hemorrhage.

This method, briefly, is as follows:

A square piece of gauze is pushed into the wound by means of an artery or dressing forceps. If the pleura has been opened by the bullet the dressing should be pushed about half an inch beyond the pleura in the direction of the lung. The front part of the gauze dressing is kept open—spread out—and a few strips of gauze (the ordinary sterile bandages found in military outfits will prove admirable for this purpose) are forced into the gauze pouch. Taking a hold now of the pouch and gently but firmly pulling it outward, pressure is obtained

from within outward, somewhat on the same principle as when we attempt to arrest post-nasal hemorrhage by forcing a tampon into the posterior nare by traction on the tampon placed in the pharynx by means of a tied string that has been led out through the exterior nare. And just as we often compress the nasal passage also anteriorly counter pressure from without can be produced against the intercostal space either by folding the free ends of the gauze dressings and fastening over it other dressings or a piece of cotton, or, better still, by tying these ends over a piece of gauze.

The same treatment is applicable for hemorrhage of the internal mammary artery.

The *ribs* can experience in modern warfare the entire gamut of injuries described in the general part, from mere contusion to great loss of substance. While a rib may be fractured without necessarily involving the lung proper or even the pleura—a missile may strike the rib at its utmost lateral portion and thus only “graze” the pleura—usually pleura and lung will be involved, and the extent of this involvement will depend on the missile. It requires no great stretch of imagination to realize that the comparatively small wound of the infantry bullet will not produce the serious effects that will be observed in shrapnel or shell-splinter wounds. While in the latter, pneumothorax and collapse of the lung are inevitable, the former may not have enough immediate effect on the wounded man to cause him to seek medical aid.

For the present it will suffice to point out that fractured ribs must be treated in the field the same as in civil life—by immobilization through circular bandaging, adhesive strips, etc. When bandages or adhesive strips happen to be absent recourse must be had to improvisation. The belt of the injured soldier will prove an excellent substitute, at least until such a time as technically better dressings can be used.

The *lungs*, when pierced by small-caliber jacketed missiles, as a rule prove benign and early recovery can be anticipated. The same holds good also for the *bronchi*. Of course, vessels may be injured and produce a hemothorax.

Other missiles produce serious results. Many deaths on the battlefield are due to injuries by shrapnel, and the opening of the bronchi by missiles of large caliber almost invariably is followed by emphysema, which in turn may produce death by asphyxia.

A hemothorax may become absorbed, as can a pneumothorax, again infection may result and then we can observe the typical pictures of empyema, abscess and gangrene of the lung. It has happened

that such an infection has produced fatal secondary hemorrhages. Undoubtedly in such cases the pulmonary vessels have been primarily injured but not enough to cause serious results. Total solution of continuity by an infection will, therefore, kill where the vessels partially escaped the original trauma.

Patients suffering from wounds of the lung *with prolapse of lung tissue*, should be dressed only after the prolapsed portion of the lung has been fixed to the external wound orifice (skin) by a few sutures (silk).

Injuries of the *esophagus* can be diagnosed at the front only with a degree of probability. Nor is it of great importance that such a diagnosis be made, if this rule be observed: *In which there is even the least suspicion that the esophagus may have been involved not a particle of food nor a drop of water should be given by mouth.* It is only by following this rule that many a life will be saved while the non-observance of such a precaution may lead to death. Morphine. Dressing.

Injuries of the *heart*, if not immediately fatal, require rest and morphine at the front.

The above brief remarks apply, of course, merely to stations in front of the field hospital. Whether the patient be treated at the aid station or the dressing station, the treatment on the whole remains the same.

Tracheotomy for a threatening asphyxia due to emphysema may have to be performed at either of these stations. This will become imperative if some time has elapsed since receipt of the wound and the field hospital is situated at some distance. If the patient is found soon after injury the latter circumstance will not interfere with transportation for it takes some time for the emphysema to assume a dangerous aspect.

As regards injuries of the heart rest and morphine are our mainstays. But suture of the heart should be undertaken.

This, however, is a formidable operation, and should be undertaken only by surgeons of great manual dexterity, though it cannot be said that the technic of the operation is especially difficult—an argument to show that medical officers accompanying regiments or attached to ambulance companies should be well trained surgeons.

We may now proceed to glance at the therapeutic opportunities at the *field hospitals*.

Gunshot wounds of the lung, find here an opportunity for rest and morphine. If within a few days effusions do not become resorbed, and produce compression symptoms—aspiration is our remedy par excellence.

The following rules must be observed. Never aspirate through the wound, but insert the needle in the usual manner and place (6th intercostal space—axillary line). Never aspirate more than 100 ccm. of the effused blood. If either the syringe or the clinical phenomena show that we have to deal with an empyema resection of a rib is indicated. This can be performed under local analgesia.

(To be continued.)

#### A THEORY OF CANCER—SUPERFECUNDATION BY SPERMATOZOA.

There is no doubt that to whatever agency the limitless growing tendency of malignant tumors may be due, the cells are imbued, as is evidenced in their every essential with a life force the parallel of which can only be seen in early embryonal life. The "spark of life," highest at the inception of the fecundated ovum, as is shown by the great mitosis, gradually wanes as life progresses. When we therefore meet with malignant growths, here is again a rejuvenation of cell energy—a renewed *vis à tergo*, which is confined not to all the tissues, but to individual types and subtypes of specific genera of tissues. . . . It is known that the spermatozoon is markedly attracted to the ovum (chemotaxis). Since this is a fact it is not possible that another supermatozoon, under certain favorable conditions may enter and cause fecundation of a part of an already impregnated ovum; and, depending upon the time of the life of the impregnated ovum, inversely as the cells are differentiated, when certain forms of monstrosities are produced; and, extending down unto the time when the cells are completely differentiated, when we may have simply fecundated completely differentiated cells, or the beginning of so-called malignant growths. Such a process might be possible at any phase of life—from earliest embryonal to post-fetal existence. Such fecundation may remain dormant, and grow at a later stage in life.—MOSES THORNER in the *Indianapolis Medical Journal*.

#### ANESTHESIA IN THYROID SURGERY.

The dangers of thyroid surgery relating to anesthesia, infection, hemorrhage and shock have been reduced to a parity with those connected with any other major surgical operation. Discussions concerning anesthesia reveal the fact that in the great goitre clinics of this country and Europe the mortality rate is about the same whether the anesthesia be local or general. These are dangers incident to any major surgical procedure and not peculiar to thyroid surgery.—J. M. BATCHELOR in the *New Orleans Medical and Surgical Journal*.



## Surgical Sociology

### FIRST AID IN THE INDUSTRIAL FIELD.\*

MAJOR CHARLES LYNCH, U. S. A.,

In Charge First Aid Department, Red Cross.

WASHINGTON, D. C.

While all in attendance at this meeting are doubtless well aware of the present death and disability rates from accident in this country, in the interest of full discussion of the subject which is assigned to me it will perhaps be desirable to say a few words on this matter. A brief statement of the American National Red Cross First Aid Department will therefore be quoted:

Accidents are constantly assuming more importance in the life of our nation. In the registration area of the United States comprising 58.3 per cent. of the total population, the statistics of the Census Bureau for the year 1910 (those last published) show, exclusive of suicide, 48,606 deaths from violence. These 48,606 deaths made a death rate of 90.3 per 100,000 estimated population for 1910, as compared with 43,627, or a rate of 85.8 in 1909. Since 1880 in the registration area in the United States deaths from accidents have increased 47.7 per cent., while in the same period deaths from tuberculosis have decreased 48 per cent. A very conservative estimate of the non-fatal accidents which resulted in incapacity for work in the United States each year is 500,000. And at least 2,000,000 accidents which cause temporary disability occur yearly. These figures, large as they are, do not begin to represent the percentage of accidents in some of the industries of the United States. For example, among railroad employees and miners, between 20 and 30 years of age, more than 60 per cent. of all deaths are due to accidents.

Deaths from accidents differ, too, from those which occur from disease. Accidental deaths are largely among the very best of our population. The suddenness and unexpectedness of such deaths and of injuries are peculiarly horrifying. Not only does the injured person suffer greatly in accidents, but in case of permanent disability or death, his family deprived of the support of the breadwinner continues to suffer. Thousands of such families become a charge on public and private charity yearly.

Reckoning the wage earning capacity of the average person killed or incapacitated by accident yearly at but \$500.00, we have an economic loss of \$250,000,000.00 per year. To this should be added the millions paid out in damage suits and legal expenses, as well as the expense involved in the surgical care of injured. The loss involved to those who are not perma-

nently separated from their work and are put to additional expense through accident should also be added in calculating the cost of accidents.

The condition being as represented, it is rather remarkable that greater efforts have not been made to correct it. Typhoid fever as a cause of death does not compare with accidents in importance, yet the work done to prevent typhoid has been many times greater than that expended to prevent accidents and the bad results of accidents.

It rather seems as though we must have assumed a wrong attitude on this question. Have we not been in the same position as the ignorant in respect to disease? That is to say, have we not ascribed too much to act of God in relation to accidents and the results of accidents? These in great measure go hand in hand, as will be explained later. Certainly physicians have not taken the lead here as they have in the prevention of disease, yet there is plenty of room for services which they alone can render.

All honor is due to those who have made our industries less dangerous through the installation of safety appliances. Last summer in Germany I was filled with admiration at the Museum of Sanitation and Safety in Charlottenburg. We have our own museum in this city, which is well worthy of a visit, and many of the large corporations have outfitted their plants with safety apparatus in a manner that could not be excelled anywhere. It might be well to mention, however, that the German museum is a government institution, and the apparatus exhibited there is made up of models to which all must conform. This would appear to be a much better plan than ours, by which the installation of safety appliances is voluntary. Certainly the State should be empowered to make regulations which will insure maximum safety to its industrial workers. This is a measure of self-protection, if nothing else. Our country cannot afford to lose its vigorous manhood at the rate that they are being lost in certain of our industries at present. Not that it is claimed that safety appliances will prevent all this loss, for, as will be stated at once, this is not the case. But, on the other hand, their importance must not be overlooked.

Now, just what are the facts in respect to the importance of safety appliances? One of the most competent observers connected with a company which operates mills and mines on an enormous scale, and which, moreover, has been among the foremost in installing safety appliances, says not more than 30 per cent. of accidents can be prevented by such appliances. No one, so far as I know,

\*Read by title at the 22d Annual Meeting of the New York and New England Association of Railway Surgeons.

claims that 50 per cent. of accidents can be prevented by safety appliances. The following figures are also frequently quoted: 33 1/3 per cent. go to risks of employment, 33 1/3 per cent. go to the negligence of the employer, and 33 1/3 per cent. to the negligence of the employee. It is at least evident that the human element enters into the cause of a very large percentage of accidents.

When the American Red Cross inaugurated its first aid campaign only a few years ago, while it had prevention as well as emergency treatment of accidents in mind—in fact, so far as I know, our little first aid textbook was the first book of this character in which much attention had been given to prevention of accidents—yet how important this might prove in a campaign of this character was not fully appreciated. Now, we have had the experience again and again that our instructed first aid men in mines are much less liable to accidents than other miners working under exactly similar conditions. That is to say, instruction in first aid to the injured has an important effect on the minds of men receiving it, which makes them more careful. Acting on this very valuable lesson, we are now devoting more and more time to teaching prevention. Toward this first aid is tending, just as truly as medicine is so tending in respect to disease. In fact, first aid is all prevention; first, it tends to prevent the accident; second, if an accident occurs, it prevents the worst results of the accident.

Probably most practical benefits will come from what I have to say if I tell just what the First Aid Department of the American Red Cross has done in the three years that it has been actively at work. It is to be understood that a great part of this work has been in the industrial field, where it is undoubtedly most needed. First, a strong committee was organized with representatives of both capital and labor interests as well as others to whom first aid was particularly important and who had special knowledge of this subject. Some of the members of the committee were and are: Mr. Julius Kruttschnitt, of the Union Pacific; Mr. Carl Scholz, of the Rock Island; Mr. John Hays Hammond, Mr. John Mitchell, Mr. W. G. Lee, Dr. J. A. Holmes, Director of the Bureau of Mines, Dr. D. G. Tolman, representing the Museum of Sanitation and Safety; and Dr. M. J. Shields, of the Red Cross. Without going into details, besides the central office in Washington we now have three physicians constantly on the road. Dr. M. J. Shields, a pioneer in first aid instruction in the anthracite regions of Pennsylvania, is the dean of this small corps, which will be increased as funds become available. Physicians on their employment are sent to Dr. Shields,

and by him are given special instruction in how to teach first aid and accident prevention. This is not as easy as it sounds; because a man is a physician it is by no means certain that he will prove a good first aid instructor. Too many stones are perhaps always cast at the recent graduate in medicine, but as a matter of fact he is perhaps least fitted to shine as a first aid instructor. He has been filled with scientific terms during his entire medical course, and when he is given an opportunity by the cork being taken out of the bottle he shoots all the long words of which he is capable at the dumbfounded first aid student. Moreover, as I have seen it in first aid instruction, there is also a tendency to teach too much anatomy and too little practical first aid. As a matter of fact, very little knowledge of anatomy is required to give good first aid treatment. On the other hand, theoretical knowledge is of little value to the first aid man. He must have the opportunity to actually demonstrate on the subject all the lessons set him by his teacher.

Lest it be thought that the Red Cross is unappreciative of the assistance its first aid department has gotten from the medical profession, I want to say right here that this is not the fact. We realize if it had not been for the assistance of the many doctors who have generously and freely taught Red Cross first aid classes that our campaign in this direction must have been a failure at the start.

Two of our physicians are constantly at work on our first aid cars. One, Dr. Shields, usually takes up accident prevention and first aid instruction for certain corporations or in certain districts. In such cases an attempt is made to give a complete course after working out a plan for an efficient emergency service. There seems to be an increasing demand for this work, and doubtless in the future the large corporations at least will pay as much attention to this method of gaining efficiency as they have already done in other directions. The larger corporations almost always desire to pay for work of this character. This naturally is acceptable to us, as through such contributions we are able to carry our work further in districts where payment cannot be expected.

Our cars have been mentioned above. We now have one car working in the East and one in the West. Our practice is to arrange with the railroad company concerned to pay all expenses involved in the transportation of the car. We pay the internal expenses, including the salaries of a physician and a porter, who also acts as cook. The interests of the railroad are, of course, considered first in the car campaign, though when no railroad engagements have to be met, lectures are given in towns.

where stops are made. As a matter of fact, we are able to meet the demands for many such lectures. Our practice on the railroads is to arrange an itinerary and send out advance notices. Stops are made at the more important points where the maximum number of men can be gathered together. The number differs, from one very important cause: Some roads give their employees the time to attend the lectures, and others require that the men stand the necessary expense themselves. The former method is, of course, much better in respect to efficiency. This work, if it is worth doing at all, is worth doing well, and the small cost of giving time to employees should, it is believed, be a just charge against the company concerned. In view of the fact that in certain mining districts we have been able to reduce disbursements of benefit associations one-half through first aid instruction, it is apparent that the company should receive more than the value of this small expenditure in increased efficiency.

We have really covered practically the entire country by our cars, except New England. Of course, we do not anticipate that we are going to teach any one all the first aid one needs to know in our railroad course. It will be necessary for the surgeons of the roads to carry on this work if notable success is to be attained. For example, on the D., L. & W., Dr. Wainwright has a splendid system for first aid instruction.

In a little over three years our doctors have traveled some 150,000 miles and have given more or less instruction to about 250,000 people. It has been said that "a little knowledge is a dangerous thing," and no doubt this is true. I am sure that any first aid courses should begin with the statement that it is just as necessary to know what *not* to do as what to do, but I am equally sure that if one demonstrates the treatment of the commonest injuries to railroad men or to anybody else, that if they encounter such injuries themselves much better care will be given than if no instruction had been afforded. Besides the work of our own physicians, backed up, as I have stated, by numerous doctors throughout the country, we are affiliated with the Y. M. C. A., the Y. W. C. A., the Boy Scouts, the Bureau of Mines, and the First Aid Society of New York City. Through these agencies we manage to reach a good many thousand people every year. With the Y. M. C. A. and Y. W. C. A. and the Boy Scouts we act as first aid representative. With the two former we issue a joint certificate. With the Bureau of Mines we are not doing as much work as was formerly the case. A satisfactory method could easily be worked out, but it

would be very expensive if all the mines were to be reached, and this is the reason why more has not been done. Of course, this does not mean that we do not reach many mines every year, for this is not the case. I think first aid is more appreciated in the mining regions than anywhere else, and we try to give as much attention as possible to miners. In the First Aid Society of New York we have members on the Board of Directors, and have conducted a campaign there recently to try to teach first aid in the industries of New York. This, I regret to say, has not met with notable success, and has been abandoned for the present. This raises rather an interesting question in regard to emergency treatment in cities. While I do not believe that first aid can be very satisfactorily taught in many industrial establishments in a city, I think that we are still very lacking in the proper organization for emergency care of ill and injured in all large municipalities. The small first aid stations which I saw in Berlin this summer impressed me very favorably. Of course, there the matter of their support is very easily provided for through the workmen's insurance. In Berlin in case of injury the person immediately goes to one of these stations and has his wound properly dressed; then, if necessary, he can return to the station for re-dressing. Now, what happens in most of our large stations? If a person is so seriously injured that it is necessary to take him to the hospital, he of course receives good care; but, on the contrary, if his injury is comparatively slight, he probably receives no care at all until later the seriousness of his condition may bring him to the hospital. If we are going to prevent deaths from accident, it seems to me essential that we should take the facts which have just been recited into careful account.

In the course of our first aid work we have found it necessary to organize a supply department. This started with some simple first aid books which I wrote and in some of which I collaborated with Dr. Shields. One of these books, by the way, has been translated into Slovak, Polish, Lithuanian, Italian, Portuguese, Spanish and Chinese, which would rather indicate that there is still some demand for first aid literature, notwithstanding the cheerfulness with which many physicians absolutely without experience in first aid have written books on this subject. Later we found it essential to supply certain teaching material, such as charts, bandages, splints, etc., for practice, and still later we went into first aid supplies. We did not do this without some hesitation, but it seemed absolutely essential to the efficiency of the First Aid Department. If one goes to a manufacturing concern and

has nothing to present but a scheme of instruction, one is just about in the position of the doctor who endeavors to treat the ordinary patient without drugs. On the contrary, if one has everything which a business concern wants, he has opened up the easiest line of resistance to it. Moreover, we consider it essential that the public be protected in some manner from inefficient first aid materials. I could name certain concerns which, by accepting the lowest bids on first aid packages, have gotten material that I would defy the most skillful surgeon to use without infecting the wound, much less the first aid man. The manner of preparing the first aid dressing is, of course, extremely important. It cannot perhaps be foolproof, but it can at least be so made that the surface which will touch the wound cannot be contaminated without gross carelessness. I want to invite your attention to the first aid packet of the American Red Cross, in which the compress is sewed to the center of the bandage, which can be opened so that the compress will fall away from the hands and will not be contaminated. I want to assert most strongly at this point that my experience would absolutely prohibit me from advocating washing the wound by a first aid man. Nothing is gained by such a procedure, and a great deal of harm may be done. I firmly believe that a first aid dressing well applied is where first aid should stop. Going further, you get into the domain of the surgeon, may injure the patient and lay any company by which he is employed liable for damages.

All of our first aid courses must be given by duly qualified physicians, and at the end of the course we provide for an examination by a physician other than the teacher of the class. A certificate is granted to successful candidates at said examination. We expect any instructor in our classes to follow our course of instruction. Not that we do not welcome suggestions at all times, but our experience has been that for industrial workers, at least, one plan of instruction must be followed, or dire confusion will result. We supply the instructor with a complimentary copy of our text book, and advise all the members of the class to procure such books. If they can also afford the charts and the instruction outfit, it is highly desirable that they should procure them. The matter of compensation of the instructor and examiner must be arranged by the class. We make no charge except for the materials, which are sold at cost, but 25 cents is asked for each candidate examined, in order to pay the necessary expenses to us. An advanced examination can be arranged one year after the first examination. This is intended to keep up in-

terest in the subject of first aid, and is wholly practical.

As a further encouragement to first aid instruction we have held numerous contests throughout the country. At some of these 70,000 men have been represented by teams. At the mine safety demonstration in Pittsburgh, Pa., we had forty teams from every mining district. The contests are followed with the keenest interest in the mining regions. We offer cups, medals, certificates, and sometimes first aid boxes. The struggle for the prizes is more acute than at an athletic contest.

We also offer small money prizes for the best first aid work done during the year. We have a special fund for railroads, which is called the "William Howard Taft Fund." Other prizes of this class are provided by the Red Cross. This is only the second year we have had these prizes, and last year but few contestants appeared. This year, however, a great many affidavits have been received in our office.

We have also gone into the moving picture business. Through the courtesy of the Edison Company we have a moving picture film which is lent here and there on request. This has been done without charge, but on account of the frequent demands I think we will be compelled to secure something, so that we may procure other pictures of the same character. I wish, as soon as I can, to get small moving picture films for the cars. These, of course, would command a large audience at all the smaller places where they stop.

There are some further details of our work which time forbids me to mention. I have already mentioned a plan followed by the Lackawanna which seems to me to be the ideal one; that is to say, I think the best results will be obtained if we make a car campaign over a railroad and then follow it up by lectures and demonstrations by local surgeons. It seems to me that the railroad company should compensate such surgeons for the time they devote to such instruction. Of course, it is as obvious that it does not make the slightest difference how perfect the hospital system of the railroad is, and how many emergency stations it has, that there is still room for knowledge of first aid. Accidents will not occur on the steps of the hospital or in front of the emergency stations, but many of them will take place miles away from other succor than that of a comrade.

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Do not be in a hurry to incise multiple, red, painful nodules in and under the skin of the legs—it may be erythema nodosum.—BERNAY'S *Golden Rules of Surgery*.

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**WALTER M. BRICKNER, M.D., Editor**

NEW YORK, FEBRUARY, 1914.

## **GWATHMEY'S OIL-ETHER RECTAL ANESTHESIA.**

The administration of ether vapor by rectum, for surgical narcosis, which at one time was thoroughly studied, never acquired general recognition and has, indeed, fallen quite into disuse. This was largely because of the severe proctitis that so often resulted. To obviate this and retain the advantages of anesthesia by this route, Gwathmey (*N. Y. Medical Journal*, December 6, 1913), has devised a simple method by which he introduces into the rectum liquid ether in which is mixed (dissolved) a quantity of olive oil varying inversely with the patient's age. The dose is regulated according to the age and weight of the patient. In children below six years of age a 50% solution is employed. It is increased in strength in older patients, and above the age of 15 years a 75% mixture is employed. As a general rule, about one ounce of the mixture is given for every 20 pounds of weight. The preparation of the patient is the same as for any operation, emphasis being laid upon thorough cleansing of the rectum. The mixture is poured into the rectum very slowly; through a catheter and funnel; about five minutes is consumed in pouring in eight ounces, the amount usually required. Anesthesia begins in about five to twenty minutes. If cyanosis or embarrassed respiration ensues, which are signs of an overdose, it is merely necessary to evacuate some or all of the mixture. After the operation, the rectum is washed out and some olive oil is poured in.

Gwathmey presents the advantages of this method as follow:

1. The element of apprehension and fear caused by placing a mask over the face in inhalation anesthesia is avoided.
2. No expensive apparatus is required.
3. The after-effects of the anesthetic are reduced to a minimum.
4. A more complete relaxation is secured than with any other known method of administration.
5. The limits of safety are widely extended, compared with other methods.
6. A more even plane of surgical anesthesia is automatically maintained than is possible by any inhalation method—unless administered by a skilled anesthetist using a perfected apparatus.

He refers to no disadvantages. His report was based on a series of 100 cases. In all of these the method was entirely successful, and there was no evil result. There was one death, that of an old man, twenty-four hours after the operation, probably not due to the narcosis.

This appears to be a satisfactory initial record of a procedure of such tempting simplicity that it would make unnecessary the services of an expert anesthetist.

We often find in medicine, however, that innovations which appear quite satisfactory to their introducers, and, at first, to others, develop defects on fuller observation. Gwathmey himself presents his report modestly and with the conservative observation that further trial is necessary. If a few hundred or thousand cases show that the procedure is as free from danger as it is simple, it will be one of the most valuable contributions to the science and art of anesthesia that has been made in many years.—W. M. B.

## **"BICHLORIDE" AND CARBOLIC POISON- ING.**

In the past few months there has been a widespread "epidemic" of cases of fatal poisoning by the swallowing of bichloride of mercury tablets. The earlier cases were, and many of the others are reported to have been, accidental. There can be little doubt, however, that most of the instances recently recorded were of suicidal origin, this poison being selected both because of the relatively pleasant form of demise the newspapers have recorded for it and because the familiar headache-tablet-mistake could be readily invoked to conceal the victim's intent.

A very proper popular demand is making for the prevention of these accidents and legislation

has been suggested to provide, 1st., that all bichloride tablets, and the containers in which they are sold, shall be of distinctive shape and color; 2nd., that they shall not be dispensed except upon a physician's prescription. To these excellent provisions we would add, 3rd., *physicians ought not to prescribe them.*

Surgeons and abstetricians can, and many of them do, conduct all of the antiseptic preparations for major or minor operations and dressings, without ever employing bichloride of mercury. What necessity, therefore, can call for its use in the household! It has been a fairly common practice to prescribe sublimate tablets for douches. Has bichloride of mercury any advantages, for such a purpose, over less toxic antiseptics? And if it has, are they not outweighed by the danger of mercurial vaginitis or more general poisoning, instances of which are not at all uncommon? For the disinfection of a wound the official or a weak tincture of iodine is far superior to bichloride of mercury, while for general wound cleansing and dressing hydrogen peroxide, boracic acid solution, and the mild, also innocuous, antiseptic mixtures familiar to every household as throat gargles, answer every first-aid requirement.

What we have said of bichloride of mercury applies even more strongly to carbolic acid to the extent that, even when handled deliberately, spilling this liquid may cause a serious burn. Moreover, the employment of even a one per cent. carbolic acid solution in an impervious wet dressing on the fingers or toes usually leads to gangrene. This is well-known to the profession, but it has not been sufficiently taught to the people at large and many a digit has been sacrificed to their ignorance.

The blame for cases of poisoning by these lethal antiseptics rests largely, we think, on the medical and nursing professions. They have been too free in ordering the drugs, too negligent of teaching their dangers, too careless of removing them from the household after their proper surgical employment has been discontinued.

Neither bichloride of mercury nor carbolic acid, lysol or any other strong cresol preparation, has ever any proper place in the family medicine closet! —W. M. B.

The "gall-bladder bridge" (either as a narrow cushion or as part of the operating table), raising the body at that point, is invaluable in increasing the accessibility of the biliary tract. It is equally useful in kidney operations.

## Surgical Suggestions

In surgical treatment when to remove a drain is almost as important a question as when to use one.

Urinary leakage, even for a few weeks after ureterorrhaphy or ureteroanastomosis does not necessarily mean failure. It may cease spontaneously.

In abdominal surgery the field should be bloodless before closing the parietes. Don't depend upon it that "that little bleeding will stop," if a little extra pains with sutures or ligatures will make it stop. Sometimes "that little bleeding" doesn't stop, but causes an intraperitoneal hematoma or an alarming secondary hemorrhage.

### RADIOGRAPHY IN MASTOIDITIS.

A radiograph gives very positive information in regard to the condition in and around the mastoid. A normal mastoid shows a very clear cut picture in which the mastoid cells can be seen distinctly. Even the thin bony partitions between the cells show very clearly in most cases, and the difference between a pneumatic mastoid with its large cells, and the small cells and dense bone of a sclerotic mastoid, is very evident.

An inflamed mastoid, which contains pus or granulation tissue, gives an entirely different picture. The inflamed area produces a blurred, hazy picture, which is in marked contrast with the surrounding normal bone. The partitions between the cells are hardly visible or cannot be seen and the mastoid looks like a homogeneous mass. If the normal and infected mastoid are taken on the same plate, the difference between the two, shows very distinctly and the normal one furnishes a valuable standard for comparison. The position of the sigmoid and lateral sinuses can hardly be seen.

In a stereoscopic radiograph much more valuable information is obtained. The sigmoid sinus can always be seen and its relation to the mastoid cells can be clearly determined. The floor of the middle cranial fossa can also be seen and its position, relative to the posterior root of the zygoma and the antrum and the middle ear, can be defined. If the dura or the sinus have been exposed by necrosis, the break in the continuity of the bone can be seen and a positive diagnosis of exposure of these structures can often be made early, before there are any clinical symptoms of such a condition.—J. M. INGERSOLL in the *Cleveland Medical Journal*.



## Surgical Sociology

Ira S. Wile, M. D., Department Editor.

### THE STANDARDIZATION OF HOSPITAL EXPENDITURES.

In the administration of hospitals, the budget occupies an important place. The amount of money available largely determines the character of the services to be rendered by the hospital and the limitations of resources test the executive and administrative capacity of the hospital superintendent. Dr. Howell, Superintendent of the New York Hospital (*Journal of the American Medical Association*, November 20, 1913), discusses many of the factors influencing hospital costs and endeavors to answer the following question:

"Why is it that, while hospitals are slowly but surely establishing certain standards of excellence and are attaching to these standards certain specific uses and pretty well defined prices as to cost, and in this way are approaching uniformity in the cost of institutional maintenance, there is such a wide difference in the per diem cost as there is at present—one dollar per day in some hospitals and three dollars and more in others?"

Considering the fact that municipal hospitals and many of those under private control have per diem per patient expenditures of from \$1.25 to \$2, while private hospitals make similar expenditures of \$2 to \$3 a day, one is ready to ask, is the service of the more expensively run institution better or more efficient than that of which the per capita cost is at the lower rate?

The term, standard, is difficult to define. The standard of hospital administration depends upon the city in which it is located, the neighborhood which it serves, and the endowment which is available for its administration. It is proper that the best organized and administered institution should set the standard of hospital efficiency for the weaker institutions. On the other hand, it may be impossible for institutions doing similarly effective work to be run with the same per capita cost, owing to the differences in the costs of food and labor and the system of internal organization.

The variations in salaries, and the differences in hospital construction create large distinctions in the per capita cost. Obviously, the maintenance of pathological laboratories, ambulance departments, or social service will alter the per diem money expended per patient so that it becomes impossible to compare hospital costs except of institutions with similar organizations. The mere fact of the affiliation of a hospital with a medical school increases the cost of a patient's maintenance, inasmuch as there is an additional expenditure for various examinations, not necessarily required in general hospitals not connected with medical schools.

The number of nurses and orderlies employed, the character of the cooks, the number of waitresses, the number of hospital diets which are main-

tained also figure largely in determining the costs of giving efficient hospital care to the patients. Similarly, wide variations arise from the character of the patients served. Hospitals largely given over to surgical services are far more expensive than those maintaining large medical services, but with few beds devoted to surgery, gynecology, or obstetrics. Wherefore, in determining hospital costs, it is again essential to compare hospitals having similar services and then the per capita costs should be established for each department rather than as a single figure for all the patients.

When hospital service is urgent and convalescent care is given not in the hospital, but in the home, the number of patients who may be cared for annually is increased, and while the efficiency of the service may be lessened, the number of patients given emergency care is increased. Hospitals maintaining a large private room service have their costs increased disproportionately to their efficiency. In determining units of costs, it therefore becomes necessary to segregate the expenditures for private patients from those devoted to the care of ward patients.

The value of studies of per capita costs has not been thoroughly appreciated. Inasmuch as hospital trustees are responsible for the proper administration of trust funds, there should be a most careful scrutiny of the expenditures for all phases of hospital organization. There is no definite standard unit cost for the maintenance of a pathological laboratory for a hospital of a hundred beds, nor for the maintenance of a laundry for such an institution. It is possible, however, to thoroughly analyze expenditures so that trustees may appreciate where-in economies may be made with a view to increasing the working efficiency of the hospital without increasing the budget.

In the Massachusetts General Hospital, a study has shown that the per capita cost of providing food for the internes is far higher than for serving the nurses or the patients. Obviously, this is more than a mere matter of interest, but it provides a problem of dietetic studies based upon the per capita costs and the nature of the food served. Similar studies of hospital expenditures in all departments, janitorial, nursing, clerical, pharmaceutical, surgical, kitchen, laundry, laboratory, ward, private room, operating rooms, ambulance, foods, plumbing, heating, lighting and repairs would give a vast amount of information relating to the general management of hospital departments. Unit costs of hospital architecture have been given some study, but the relation of hospital construction to the internal costs of administration have not been thoroughly reported by those who have made such studies for the benefit of communities whose hospitals are to be built in the future.

The science of accounting and the studies of efficiency have not been generally applied to hospital and dispensary services. Despite the fact that standardization is not possible in the light of our present knowledge, it is practicable for individual hospitals to approximately standardize their own unit costs so that the annual budget will be based

upon definite experience carefully analyzed. It would be practically impossible to apply the standards collected for any single institution to an institution of a similar or dissimilar nature in the same or another city. Such unit costs, however, would be exceedingly suggestive to hospital superintendents throughout the country in comparing their per capita expenditures with a view to recognizing the variations in different departments for the purpose of determining whether their relative costs are reasonable and productive of the best results.

In the case of state and municipal institutions, it is essential to determine by a scientific analysis of all the departments the per capita costs in order to secure internal economies or expansions, as may be required to enhance the communal value of the institution without increasing the annual budget, save insofar as may be demonstrated to be necessary on the basis of the relation of the per capita costs to the per capita benefits. The mere expenditure of increased sums of money per capita in various departments does not indicate that better service is afforded; and on the other hand a decrease per capita expenditure does not necessarily mean a decreased benefit to the individual patient. The factors entering into hospital care are so numerous that until a careful investigation is made of the relative cost of each of them and their relative worth, it will be difficult to interpret the hygienic, medical and surgical value that should be connoted in items of hospital per capita costs.

## Book Reviews

**A Manual of Surgical Treatment.** By SIR W. WATSON CHEYNE, Bart., C.B., D.Sc., LL.D., F.R.C.S., F.R.S., Hon. Surgeon in Ordinary to H. M. the King; Senior Surgeon to King's College Hospital; and F. F. BURGARD, M.S. (Lond.), F.R.C.S., Surgeon to King's College, and Senior Surgeon to the Children's Hospital, Paddington Green, London. *New* (2d) edition. Thoroughly revised and largely rewritten, with the assistance of T. P. LEGG, M.S. (Lond.), F.R.C.S., Surgeon to the Royal Free Hospital; Assistant Surgeon to King's College Hospital, and ARTHUR EDMONDS, M.S. (Lond.), F.R.C.S., Surgeon to the Great Northern Central Hospital. In five octavo volumes, containing 3,000 pages; illustrated with about 900 engravings. *Volume V*; 619 pages. Philadelphia and New York: LEA & FEBIGER, 1912. Price, cloth, \$6, net, per volume.

In reviews of the four preceding volumes we have sufficiently indicated the excellence of this work and the thoroughness of its revision in this second edition. Volume V, the last volume, deals with the treatment of the surgical affections of the pancreas, liver and spleen, the neck, breast and thorax, and the genito-urinary organs.

**The Principles and Practice of Gynecology for Students and Practitioners.** By E. C. DUDLEY, A.M., M.D., ex-President of the American Gynecological Society; Professor of Gynecology, Northwestern University Medical School, etc., etc. *Sixth* edition. Large octavo; 795 pages; 439 illustrations and 24 full-

page plates, some in colors. Philadelphia and New York: LEA AND FEBIGER, 1913. Cloth, \$5.00, net.

This well-established work needs no extended review. As before, the subjects are grouped on the basis of pathologic and etiologic relationship, rather than by anatomical classification, which greatly enhances the value of the book. Various new operations are described and illustrated, notably types of hysterectomy, myomectomy and perineorrhaphy. The entire book shows careful revision, and extensive changes have been made in the general chapters dealing with inflammation, tumors and traumas. The numerous original illustrations, of which several are new, are of the highest excellence.

**Cancer of the Breast. An Experience of a Series of Operations and Their Results.** By CHARLES BARRETT LOCKWOOD, F.R.C.S. (Eng.), Consulting Surgeon to St. Bartholomew's Hospital, etc., etc. London: HENRY FROWDE and HODDER & STOUGHTON, 1913.

Almost completely omitting reference to the work of others, Lockwood presents a monograph based on his own extensive material that should prove a model for honesty, simplicity, and clinical thoroughness. The book is replete with details, but the principal themes are never lost in the wealth of minutiae. It is believed that these remarks upon the value of Lockwood's monograph will serve the purpose of calling attention to his exceedingly instructive work far better than the presentation of many minor criticisms—mostly favorable and a few adverse. The book should be thoroughly studied by all interested in the surgery of breast cancer.

**Applied Pathology. Being a Guide to the Application of Modern Pathological Methods to Diagnosis and Treatment.** By JULIUS M. BERNSTEIN, M.B. (Lond.); D.P.H. (Camb.); M.R.C.P.; Assistant Physician (late Pathologist) to the West London Hospital; Lecturer in Clinical Pathology to the Post-Graduate College, etc., etc. Octavo; 395 pages; 45 colored plates and 46 drawings. London: UNIVERSITY OF LONDON PRESS. Published for the University of London Press, Ltd., by HODDER & STOUGHTON and HENRY FROWDE, 1913.

This work covers a rather wide scope. In addition to the clinical pathology of the blood, urine, sputum, feces, cerebro-spinal fluid, exudates, etc., there are chapters on opsonins, vaccine therapy, bacteriology, serotherapy and diagnosis, tuberculin diagnosis and therapy and chemotherapy. Obviously only the barest outlines of these topics can be discussed in a book of this size. As a manual for the general practitioner this book may therefore prove useful, but as a work of reference it is of no value whatever. Technical methods are given very meagerly. The text, as far as it goes, is satisfactory. The only large point for criticism is the author's belief (in common with most English writers) in the omnipotent properties of vaccines.

**Dysenteries: Their Differentiation and Treatment.** By LEONARD ROGERS, M.D., F.R.C.P., F.R.C.S., C.I.E., Physician to the Isolation Ward (cholera and dysentery) Medical College Hospital, and Professor of Pathology, Medical College, Calcutta. Octavo; 336 pages. London: HENRY FROWDE and HODDER & STOUGHTON, Oxford Medical Publications, 1913.

It is well to remind the reader that the author of this work is the discoverer of the specific action of emetine in amebic dysentery. If on no other grounds, the appearance of this book should therefore be welcome. In addition, however, we find it a mine of information concerning the various forms of dysentery, especially the amebic and the bacillary, all based on an immense experience in India. Both these maladies are discussed in the usual didactic order, the etiology, pathology, symptomatology and therapy being discussed successively. The entire tone of the book is one of authority, affording a monograph that no one interested in dysentery can well be without.

**The Principles and Practice of Medical Hydrology.** Being the Science of Treatment by Waters and Baths. By R. FORTESCUE FOX, M.D. (Lond.); F.R. MET. SOC. Octavo; 295 pages. London: UNIVERSITY OF LONDON PRESS; HODDER & STOUGHTON and HENRY FROWDE, 1913.

This book takes up in a systematic manner the chief facts connected with the use of water in the therapy of disease. The first section deals with the physiology of bathing and the use of baths in health. The second deals with the principles involved in the use of water in disease; the third describes the various mineral springs, while the final portion reviews briefly the indications which call for the use of the various hydro-therapeutic procedures. The book is especially useful to patients taking cures in England, as particular attention is paid to the British spas.

**Case Histories in Pediatrics.** A Collection of Histories of Actual Patients Selected to Illustrate the Diagnosis, Prognosis and Treatment of the Diseases of Infancy and Childhood, with an Introductory Section on the Normal Development and Physical Examination of Infants and Children. By JOHN LOVETT MORSE, A.M., M.D., Associate Professor of Pediatrics, Harvard Medical School; Associate Visiting Physician at the Infants' Hospital and at the Children's Hospital, Boston. Second edition. Octavo; 639 pages. Boston: W. M. LEONARD, 1913. Price \$5.50.

The appearance of a new edition of Morse's book after so short a period of time is a recommendation in itself; but this second edition is so much more complete and so superior to the older one that it is in reality a new book. The number of case histories has been doubled, and there has been added a section of fifty pages on the normal development and physical examination of children. This portion of the new book should prove of the greatest value to the student, since in it he will find facts and figures relative to the child's growth and development, set forth in so terse and clear a manner that they must needs be very easily found and remembered.

The illustrations, which in the first edition were few in number and poorly executed, are now a very distinct addition to the usefulness of the book, being well reproduced on glazed paper.

The case histories are reported in a clear and interesting style, which makes their reading entertaining as well as instructive. For the student a careful consideration of the history and physical examination of each case, before he attempts to solve the diagnosis, must necessarily acquaint him with the commonest signs and symptoms of children's diseases. For the practitioner, however, the paragraphs on diagnosis, and especially those on prognosis, are very helpful, especially when it is remembered that these are all actual cases whose outcome is faithfully recorded.

Altogether, this new edition may be most highly recommended as an interesting and highly useful text-book of pediatrics.

**Malaria.** Etiology, Pathology, Diagnosis, Prophylaxis and Treatment. By GRAHAM E. HENSON, M.D., Member, American Medical Association, Florida Medical Association, American Society of Tropical Medicine, Medical Reserve Corps, United States Army (non-active list). With an introduction by CHARLES E. BASS, M.D., Professor of Experimental Medicine, Medical Department Tulane University, New Orleans. Octavo; 190 pages; 27 illustrations. St. Louis: C. V. MOSBY COMPANY, 1913.

This small book, like his other contributions to the subject, indicates Henson's first-hand clinical and hematological studies of malaria. It is a first-rate presentation of the most important phases of the subject. The occasional appearance of malaria as a complication of surgical illnesses, and the occasional confusion of malarial seizures with acute abdominal disorders, make it important for surgeons to be familiar with these manifestations which Henson calls attention to. The author describes the various forms of malarial parasites, their biological characters, and the various forms of pathogenic and non-pathogenic mosquitoes. The description of the pathology of the

disease is short but covers most of the ground. In the chapter on prophylaxis the various methods by which larvae may be exterminated are admirably set forth. The various methods of treatment of malaria are reviewed and the author's preferences indicated. The illustrations are mostly half-tone photographs and are only fair in quality.

**Gout.** Its Etiology, Pathology and Treatment. By JAMES LINDSAY, M.D. (Edin.), M.R.C.P. (Lond.), Hon. Physician, formerly Hon. Pathologist and Resident Medical Officer, Royal Mineral Water Hospital, Bath. Duodecimo; 212 pages. London: HENRY FROWDE, Oxford University Press, and HODDER & STOUGHTON, 1913.

The discussion of the etiology and clinical phenomena of gout leaves nothing to be desired. The chapter on the chemistry of gout reveals acquaintance with modern studies. In the treatment, the author recommends the usual measures and regards colchicum as a specific. No mention is made of some of the newer drugs. The spa treatment is discussed fully, and the value of the various English and Continental spas are weighed in the balance. The author has evidently a wide experience with this disease, and has made a useful manual.

**The Problem.** The Autobiography of a Physician. By CHARLES PERCY, B.Sc., M.D. Duodecimo; 128 pages. New York: THE SHAKESPEARE PRESS, 1913.

The title of this book is well chosen, whether the author intended that it should connote the subject of his thesis or the state of mind of the reviewer as to the character of the book. The book may be regarded either as a quasi-metaphysical disquisition on sleep or as a ghastly fantastic tale. Whatever it is, it is tiresome, long drawn out and without point.

**Collected Papers From the Research Laboratory,** Parke, Davis & Co. Small octavo; 287 pages, Reprints Vol. 1. Detroit, Mich., 1913.

The reprints collected in this volume represent work of high scientific value and reflect favorably upon the enterprise of the manufacturers. The papers include researches in botany, bacteriology, pharmacology and the internal secretions.

**The Treatment of Rheumatic Infections.** Octavo; 134 pages. Press of PARKE, DAVIS & COMPANY, 1913.

This book deals with the theory and practice of the rheumatism phylacogen. To those desiring to try this new method of therapy, it should prove a valuable manual.

## Books Received

**Anatomy and Dissector in Abstract.** By STEWART L. MCCURDY, A.M., M.D., author of "Oral Surgery," "Orthopedic Surgery," etc.; Professor of Anatomy and Surgery (Dental Department), University of Pittsburgh; Orthopedic Surgeon, Presbyterian and Columbia Hospitals, Pittsburgh, etc. Fourth edition. Vest pocket size; 372 pages; illustrated; flexible leather. Pittsburgh: MEDICAL ABSTRACT PUB. CO.

**The Surgical Clinics of John B. Murphy, M. D.,** at Mercy Hospital, Chicago. Volume II. Numbers IV, V and VI. Octavos; illustrated. Philadelphia and London: W. B. SAUNDERS COMPANY, 1913. Published bi-monthly. Price per year: Paper, \$8.00. Cloth, \$12.00.

**The Practitioner's Case Book.** For Recording and Preserving Clinical Histories. Prepared and arranged by the Editorial Staff of the *Interstate Medical Journal*. St. Louis: THE INTERSTATE MEDICAL JOURNAL CO.

# Progress in Surgery

A Résumé of Recent Literature.

## Recent Advances in the Surgery of the Lung and Pleura. H. MORRISTON DAVIES, London. *The British Journal of Surgery*, 1913, Vol. 1, No. 2.

Many who have not followed closely modern advances in this field erroneously believe that the progress has been exclusively in the technic allowing of operations in the open chest. Although the apparatuses of Sauerbruch, Brauer, and others have greatly facilitated the surgical treatment of certain groups of intrathoracic diseases, "the total number of cases in which this technic is necessary is quite small compared with the great number of patients who have benefited by modern progress. The result of such progress has been the emergence of three main lines of treatment, which may be termed: (1) Treatment by collapse; (2) treatment by consolidation and fibrosis (solidification); (3) treatment by excision."

The treatment of pulmonary tuberculosis by nitrogen displacement, first devised by Forlanini in 1892, now rests upon a firm basis. It is especially indicated in those chronic and progressive cases that resist the usual methods of treatment, for tuberculosis complicated by extensive cavity formation or by secondary pyogenic infection, and for those cases complicated by repeated or profuse hemoptysis. Two serious complications may arise in the application of the nitrogen displacement method: Nitrogen embolus, and the train of symptoms termed "pleural eclampsia" or the "pleural reflex." The former is due to the needle entering the lung and the gas escaping into a blood-vessel. The latter may be caused by the needle puncturing the pleura, by the introduction of the gas under excessive pressure, or by the rupture of delicate adhesions from the pressure of the introduced nitrogen. The symptoms generally consist of a profound syncope, usually transient, but sometimes ending fatally. Both of the complications are avoidable by: 1. Local anesthetization by novocain, and 2. The employment of an apparatus of the Forlanini type, the water manometer indicating the position of the needle in the pleural chink.

It is well known that the usually employed method of aspiration of the chest for pleural effusion is not devoid of danger, and that it does not remove a sufficient amount of fluid in many instances. Davies has shown that, if oxygen is allowed to flow into the chest as soon as symptoms of distress from the aspiration appear, the symptoms will at once vanish. Furthermore, by combining oxygen replacement with aspiration, all of the fluid can be withdrawn. This is radiographically demonstrable.

Concerning the treatment of acute abscess and gangrene of the lung (the author does not differentiate between these conditions), it is pointed out that the results of the surgery of the past ten years have shown steady diminution of mortality and steady increase in the percentage of cures. This improvement is undoubtedly dependent upon the progress of radiology in localizing pulmonary foci and upon the diminished danger of opening the thoracic cavity. Davies enters into the details of the operation for acute abscess and gangrene.

Solidification of the lung is the basis of the surgical treatment of bronchiectasis and of tuberculosis. The nitrogen displacement method has already been discussed. For permanent solidification, however, that procedure is not effectual and the following must be employed: (a) By solidification of part of the lung (rib resection or division of the phrenic nerve or ligature of the pulmonary artery); (b) by solidification of the whole lung (rib resection or rib mobilization). The various indications for these different types of operation are discussed by the author.

## Hemorrhagic Infarcts of the Pancreas. CHABROL, *Archives des Maladies de l'Appareil Digestif et de la Nutrition*, September, 1913.

Chabrol advances as a theory the idea that hemorrhages

into the pancreas with fat necrosis are due to a thrombosis of the veins of that organ. This takes place, as it does in phlebitis, involving the mesentery of the intestine and the portal system elsewhere. It is based upon a diseased condition of the wall of the vein and of the artery. Cirrhosis of the pancreas, associated with hepatic cirrhosis, predisposes. Following the pancreatic thrombosis, there is an activation of trypsinogen, a liberation of the lipase, causing autolysis of the pancreas and diffuse fat necrosis.

Bacterial infection, through the Wirsung duct or hematogenous entrance, plays a part in the process.

## The Anatomical Findings in Carcinomata Treated by Mesothorium and X-Ray. (*Anatomische Befunde bei mit Mesothorium und Röntgenstrahlen behandelten Karzinomen.*) PAUL HAENDLY, *Zentralblatt für Gynäkologie*, No. 39, 1913.

Five specimens were examined, three of which were obtained through operation and two through autopsy. The superficial layers of carcinoma cells are seen to necrose and disappear, while the deeper layers of cancer cells show more or less degeneration of the nucleus and the protoplasm. There remains, however, in spite of the deep penetration of the ray, a certain rest of cancer-nests which are capable of further propagation. The other tissues adjacent to the carcinoma are also affected. The effect is not uniform. It must be conceded that the effect of the x-ray and of mesothorium has been considerably increased owing to the newer method of more intense filtration without having the deleterious action on healthy tissues.

## The Clinical Status of Cancer of the Corpus Uteri. (*Die Klinische Stellung des Carcinoma Corporis Uteri.*) W. WEIBEL, *Zentralblatt für Gynäkologie*, No. 39, 1913.

Of 69 cases of cancer of the body of the uterus reported from the Wertheim Clinic only two cases were considered inoperable. In 15 per cent of the cases the tumor was discovered by accident. In 19 cases it was associated with myomata, in 5 cases with cysts of the ovary, in 5 cases with carcinoma of the ovary, in one case with carcinoma of the tubes, and in still another case with ovarian sarcoma. The striking symptom was hemorrhage which was especially marked in the post-climacteric state. The primary mortality was 10½ per cent. The radical operation showed a far greater mortality than the vaginal operation, being as 25 per cent to 2.8 per cent. Nulliparæ are particularly susceptible. The parametrium is relatively free while the regional lymph-nodes are more commonly attacked than was apparent hitherto. The permanent cures after five years included 51.2 per cent of the cases. The radical abdominal operation has also decided advantage over the vaginal operation from the viewpoint of permanent cure and should be the operation of choice except where there is a distinct contra-indication against the former method. The inguinal glands need be only exceptionally removed.

## Spontaneous Fracture and Bone Cysts. A. C. BURNHAM, New York. *Interstate Medical Journal*, November, 1913.

Burnham describes in detail the case of a man of forty-seven years who sustained a fracture of the right leg. A routine x-ray examination revealed a degenerative condition of the lower third of the right tibia associated with fracture. At the time sarcoma was diagnosed and operation advised. However, the patient refused operative treatment and the fracture united after two months. One year later the leg again gave way and the patient was unable to walk. A tumor was now present in the leg, a section of which showed giant celled sarcoma. One year later, the patient having lost thirty pounds in weight, he consented to operation and the leg was amputated at the knee. At the time of reporting the case, three years after operation, the patient remains in excellent health.

From this case and from a study of the literature, the author concludes that there is a marked resemblance of certain cases of giant-celled sarcomata to benign bone-

cyst, both in the early symptoms and in the radiographs of the early stages of growth. The case moreover emphasizes the need of taking a radiograph of every case of fracture due to slight violence; and also shows that giant-cell sarcoma of the long bones is of slow growth and proceeds with no metastases.

**Synovial Lesions of the Skin.** O. S. ORMSBY, Chicago. *The Journal of Cutaneous Diseases*, November, 1913.

The condition, first described by Hyde, consists of one or more wart-like projections, always over the side of bursal connected with tendons that traverse the small articulations of the hand and foot. The lesions are most often encountered over the metatarsophalangeal articulation or, in the hand, over the dorsal surface of the distal articulations of the thumb and index fingers. The form generally seen is a pea-sized, roundish mass, the center yellowish; the lesion is of long duration and quite insensitive. A peculiar fluid, syrupy and of a yellowish color, escapes when the mass is punctured, and promptly recurs even after the puncture. This fluid is not found in any other condition. Hyde states that "in every case the contents of the lesion are supplied by a synovial bursa beneath the skin, with which the lesion is either directly connected, or in communication by a short sinus."

Excision of these lesions, whose etiology is as yet very obscure, is followed by recurrence; radiography, on the other hand, resulted in cure in the four cases reported by the author.

**A Preliminary Report on 120 Cases of Tuberculosis Treated With Friedmann's Vaccine.** H. L. BARNES, *The Providence Medical Journal*, November, 1913.

Summarizing the report of 120 cases of tuberculous disease treated by the Friedmann vaccines at the State Sanatorium, R. I., Barnes says: The vaccine bacilli were not always acid fast. One injection of vaccine was harmless to guinea-pigs and turtles. Fourteen per cent of patients had fever reactions above 100°. Inoculation induration after first injection was present in 70 per cent. The average duration of the induration was 41 days. Abscesses occurred in 23 per cent. The average duration of discharge from the abscesses was 23 days. The cough and expectoration showed no striking improvement. Bacilli persisted in the sputum in 85 per cent of positive cases. The usual appetite continued, except in reacting patients in whom it was worse. Vaccine patients lost more weight than others. Twenty per cent had improvement in chest-pain the remainder being unchanged or worse. Patients had more fever and night sweats after the vaccine than before. Blood spitting was as frequent after as before vaccine treatment. There was no unusual tendency towards disappearance of physical signs, which were increased in many patients who were improving before. Forty per cent of the 85 patients whose present condition is known at an average period of four months after the first injection are worse.

Conclusions: 1. This report offers no evidence as to whether or not the vaccine can prevent tuberculosis in those who are free from it, as no healthy persons were inoculated.

2. It offers no evidence as to the liability of the vaccine to induce local or general tuberculosis, as this can be determined only by autopsy or special bacteriological work.

3. One patient with joint tuberculosis showed striking improvement, which makes it desirable that similar patients who have received this vaccine should be observed and reported on by those who have had orthopedic experience. The four other patients having active tuberculosis outside the lungs have not shown unusual improvement.

4. The 120 patients having pulmonary tuberculosis have shown none of the immediate and wonderful results reported by Friedmann and others before the Berlin Medical Society. On the contrary, about 17 per cent of the cases have shown an increased activity of the disease, which would not have been expected under ordinary sanatorium treatment. The permanent good or harm done these patients can only be measured with reasonable accuracy from one to three years after the administration of the vaccine.

**The Prognostic Value of the Evidence of Streptococci in the Vaginal Secretion of Women in Labor.** (*Über die Prognostische Bedeutung des Nachweises von Streptokokken im Vaginalsekret Kreissender.*) MARGARETE GOLDSTROM, *Zentralblatt für Gynäkologie*, No. 40, 1913.

In 902 women examined during the period of labor, streptococci were absent in 514 cases, anhemolytic streptococci were present 369 times and hemolytic streptococci were found 19 times. The outcome of these labor cases was varied and classified according as to the method employed in the delivery. The author's conclusion is that the prognosis for women who enter the clinic without fever is absolutely independent of the presence of streptococci in the lower third of the vagina.

**The Trendelenburg Posture in the Reposition of the Retroflexed Uterus.** (*Beckenhochlagerung bei Reposition des Retroflektierten Uterus.*) DR. LIEBL, *Zentralblatt für Gynäkologie*, No. 40, 1913.

The elevation of the pelvis as recommended by Trendelenburg has been found serviceable in the attempt at reposition of the retroflexed uterus. It is especially helpful in retroflexed gravid uteri. In some cases the very postural change induces spontaneous reposition.

**Pigmentation of the Nails During Pregnancy.** (*The Role of the Glands of Internal Secretion in the Genesis of Fibroma Molluscum Gravidarum, Together with a Description of the Pigmentation of the Nails in Pregnancy.*) SAMUEL M. BRICKNER, *New York. Surgery, Gynecology and Obstetrics*, October, 1913.

Brickner describes a perpendicular pigmentation of the nails arising in the fourth month of pregnancy. The color was at first light brown, but became much darker as the pregnancy advanced. Eighteen months later the pigmentation was still present, but was not as dark as it had been. Photographs accompany the article.

**A Contribution to the Histogenesis of Sarcomatous Changes in Uterine Fibromyomata.** SAMUEL H. GEIST, *New York. American Journal of Obstetrics*, December, 1913.

Geist has studied the material in the Mt. Sinai Hospital laboratory and has found two cases in which it was possible to trace the origin of the sarcoma cells from the muscle cells of a fibromyoma. In other cases, the interstitial tissue of a myoma, the adventitia and endothelium of the lymph and blood-vessels have been seen to be the origin of the malignant change. To these, Geist adds the muscle cells as a source of the neoplastic change.

**Cardiac Disease and Pregnancy.** (*Herzfehler und Schwangerschaft.*) P. KREISS, *Dresden. Zentralblatt f. Gynäkologie*, December 13, 1913.

The author sums up his conclusions as follows: 1. In cases of mild decompensation, absolute rest in bed, with a careful control of the specific gravity, amount and contents of the urine. 2. If the symptoms of decompensation do not disappear in a few days, digitalis, caffeine and alcohol are administered. 3. If the edema and ascites, the dyspnea and cyanosis and extra-systolic beats do not disappear, and if the amount of urine becomes diminished while the specific gravity rises, and if casts are found, the interruption of the pregnancy must be considered. 4. Induction of labor is also indicated in cases of congenital stenosis of the pulmonary valve, of pericarditis and of combined endocarditis and myocarditis. It is also to be resorted to if the cardiac disease is complicated by tuberculosis, pernicious anemia or large goiters.

**The Treatment of Sterility by the Dudley-Reynolds Operation.** F. C. HOLDEN, *Brooklyn. American Journal of Obstetrics*, December, 1913.

Holden, from an extended experience, concludes that the Dudley operation takes the cervix out of the axis of the

vagina and puts it into its normal axis; it removes the external os from the anterior position in the vagina and places it well back in the seminal pool. The Reynolds operation removes the flexion of the anterior wall of the uterus and gives a longer anterior invagination with a straightened anterior uterine wall. About eighty-five per cent of the cases of dysmenorrhea and twenty-five per cent of those of sterility are cured by the operation. These figures correspond quite accurately to those of S. Brickner given in his article on the Dudley operation, with which Holden compares his statistics.

**Malignant Growths of the Colon, With Especial Reference to Early Diagnosis and Treatment.** R. W. WESTBROOK, Brooklyn, N. Y. *Long Island Medical Journal*, December, 1913.

Among the points on diagnosis of colonic new growths. Westbrook describes a case in which small pigmented spots and warts on the skin of the abdomen occurred in a case of cancer of the large gut, and just as in the cases described by Willy Meyer, these skin manifestations became less marked when the new growth had been removed.

The most common seat of colon cancer, next to that of the sigmoid, is about the ileo-cecal valve, and here it is comparatively early accessible to palpation. In this region the mass, when small, is often mistaken for a chronically thickened or adherent appendix.

The author believes that when cancer is suspected and the usual methods of diagnosis have not solved the problem (x-rays, sigmoidoscopy, etc.), that exploratory operation is advisable. Especially is this the case in growths of the large gut, owing to the fact that from their lymphatic drainage they are considerably less rapidly spread than are cancers of the stomach. For this reason also, these tumors should be surgically attacked when even clinically far advanced.

**A Manifestation of Hypothyroidism Not Heretofore Described.** HEINRICH STERN, New York. *The Archives of Diagnosis*, October, 1913.

From a consideration of four cases which are reported in detail, Stern concludes that there may be very distinct pathological manifestations on the part of the urinary tract in cases of hypothyroidism. Three of his cases are women, one a man. The symptom which led to cystoscopy was dribbling of urine. The cystoscope revealed a doughy infiltration along the floor of the urethra, which disappears on the administration of thyroid substance, and which the author therefore concludes must consist of myxedematous tissue. The author believes that in frequent painful micturition, a general hypothyrotic state of the individual with manifestations in the lower urinary tract must be thought of and a cystoscopic examination insisted upon; that furthermore such symptoms may be the only ones of import in hypothyroid individuals; last, that enuresis in children as well as in adults may be due to a hypothyroid state, that the cures of such cases of thyroid medication may be due to the disappearance of myxedematous swellings from the lower urinary tract, and that in persistent bed-wetting a cystoscopy should be insisted on.

**Bilateral Hydroureter—Chronic Pyocyanous Infection.** HENRY HEIMAN, New York. *Archives of Pediatrics*, November, 1913.

Heiman describes the case of a male child five years of age, who was admitted to the hospital for pyuria, fever and lumbar pain. A careful study, both bacteriological and cystoscopic, revealed the fact that the child was suffering from a bilateral dilatation of the ureters which were greatly twisted and contorted, and that the urine was infected by the pyocyanous organism. The dilatation of the ureters was demonstrated by the injection of 40 per cent argyrol into the bladder, the child being put into the Trendelenburg position so as to allow the fluid to pass up into the pelvis of the kidneys. X-ray pictures were then taken. The child was treated with pyocyanous vaccine, but only temporary relief was obtained.

**The Tonsils: Some Pathological Reasons for Their Removal.** LORENZO N. GROSVENOR. *The Journal-Lancet*, December 1, 1913.

The author presents a number of illustrations of microscopic sections of removed tonsils and comments on the frequency with which infectious material is found within their substance. Ray fungi were present in 15 per cent of the cases, tubercle bacilli in 5 per cent. In three cases bone tissue and cartilage was found, which led the author to the conclusion that these were remnants of displaced embryonic tissue from the second bronchial arch. The finding of so many infected tonsils is an added argument in favor of tonsillectomy as against tonsillotomy.

**Acute Thyroiditis as a Complication of Acute Tonsillitis.** C. F. THEISEN, Albany, N. Y. *New York State Journal of Medicine*, December, 1913.

Theisen describes seven cases of acute inflammation of a previously normal thyroid gland. In six of these seven the inflammation followed immediately upon an attack of acute tonsillitis. The gland became swollen, tender, and the skin over it became reddened. At the same time the patients experienced pain and, especially in those cases in which the left lobe was involved, dysphagia. The disease in each case occurred in a young woman. In two of the cases the illness was followed by a diffuse goiter. The writer gives a brief review of the literature which shows that the condition has been very seldom recorded.

**The Intranasal Treatment of Dysmenorrhea, With a Report of 93 Cases.** EMIL MAYER, New York. *Journal American Medical Association*, January 3, 1914.

Referring first to Fliess' work on the relation between the nose and uterus, and his description of "genital spots" in the nasal mucosa, Mayer reports his own experience with the intranasal method of treatment of dysmenorrhea. In cases in which absence of uterine disease as a cause was established by careful examination, and the failure of the usual treatment, especially when there was no obvious nasal stenosis which was so in most the cases, and there also existed decided tumefaction about the genital spots, he found that the application of cocaine gave wonderful relief to many of the patients. This treatment had to be repeated at each menstruation, and he therefore substituted the galvanocautery or trichloroacetic application. The results obtained by the latter method were so permanent that he has lately used this exclusively. He says: "A mild solution of cocaine was applied just before the use of the acid. The slough that forms disappears in about five days, and another application may then be made. The patient was then asked to report the results of her next menstruation. If entirely favorable nothing further was done." In cases in which relief was slight or wanting, four applications were made between the menstrual periods, and if no benefit followed then it was so reported. Ninety-three cases are briefly reported to go into the author's reprints. His conclusions are as follows: "1. Permanent relief is obtainable by intranasal treatment from 50 to 75 per cent of the cases. 2. Trichloroacetic acid applied to the genital spots four times at intervals between menstrual periods is usually sufficient to obtain lasting results. 3. It affords an additional field of usefulness to our therapeutics. These patients were from every walk in life. Only the bare facts of the cure of a large number of these patients are given; but we should bear in mind that all of these women suffered inordinately, for most women accept some pain at menstruation as a matter of course, and it is only after the suffering becomes unbearable that the physician is consulted. Therefore, their relief without drugs, operation and uterine treatment, by a few applications to the nose adds materially to their comfort and the joy of living."

**Closed Tuberculous Pyonephrosis.** H. A. FOWLER, Washington. *Journal American Medical Association*, January 3, 1914.

Fowler describes closed pyonephrosis as one of the most unusual complications of renal tuberculosis and one that presents greater difficulties in certain cases for diagnosis



than any other condition of the kidney. Even with the aid of the newer methods a definite pre-operative diagnosis is sometimes impossible. In the majority of cases there is a renal distention showing itself by a lumbar or abdominal swelling. In a smaller number there is no swelling present and the affected organ is atrophic. The pathologic changes are not limited to the kidney and ureters, the infection may extend elsewhere by rupture of the sac or indirectly through the lymphatics. The bladder may also become secondarily infected. The cases can be divided into the following three groups: 1. The bladder is tuberculous. In the region of the supposedly diseased kidney a large tumor, the pyonephrotic sac is found. The ureter on this side is impermeable. Diagnosis is easy. 2. The bladder is normal. One ureter is impermeable, and on this side there is a tumor in the kidney region. Diagnosis is possible from the history of the case, and symptoms referable to other organs. 3. The tuberculous involvement of the bladder is far advanced, and cystoscopy is impossible. An enlarged kidney can be palpated. Diagnosis is possible only by exploratory incision. The enlarged kidney may be healthy and only hypertrophied, while the other kidney is atrophic and tuberculous. In the case reported the abscess was opened and temporary improvement followed, but profuse discharge continued, and a second operation had to be done. The bladder was also infected from the first, though there was no marked ulcerative cystitis, which had been observed by another physician previously. This had apparently cleared up and disappeared, and shows how the bladder tuberculosis sometimes heals when the primary source of inflammation has been removed. Another feature of the case was the rupture of the abscess through the diaphragm, causing a tuberculous empyema, and still another was the formation of a fecal fistula through the operation wound, accounted for by the removal of support of the weakened and adherent bowel by drainage of the abscess.

**The Treatment of Dysmenorrhea With Atropin.**  
(*Zur Atropinbehandlung der Dysmennorrhöe.*) J. NOVAK, Vienna. *Wiener Medizinische Wochenschrift*, December 11, 1913.

Novak holds atropin in high esteem for the treatment of dysmenorrhea. In 38 patients in whom this drug was tried, the pain either completely disappeared or was very slight. The drug is given only during the menstrual flow and in doses of 0.0005 three times daily, or in suppositories (0.001) once or twice daily. The article concludes with a discussion of the physiological rationale of this form of therapy.

**The Elimination of Ascites.** (*Zur Beseitigung des Ascites.*) J. KUMARIS, Athens. *Centralblatt für Chirurgie*, December 13, 1913.

Kumaris comments on the inadequacy of the current surgical methods of treating ascites, such as the Talma operation, anastomosis of the peritoneum to a vein, etc. On physiological and experimental grounds, Kumaris advocates the removal of large portions of the parietal peritoneum, thereby enabling the ascitic fluid to become absorbed by the lymphatics of the bared tissues. The operation, briefly, consists in removal of large areas of peritoneum of the anterior abdominal wall, over the diaphragm, the liver, the spleen and near the hilus of the kidney. In one case the result was brilliant up to the time the patient died from facial erysipelas twenty-two days after operation. While Kumaris rightly holds that the period of observation is too short, he nevertheless believes that on purely theoretical grounds the operation deserves trial.

**Diaphragmatic Friction, an Early Symptom of Gastric Perforation.** (*Das Zwerchfellreiben ein Frühsymptom der Magenperforation.*) A. BRENNER, Linz. *Wiener Medizinische Wochenschrift*, November 27, 1913.

In five or six cases of perforation of the stomach following ulcer, Brenner found a peculiar metallic tinkling friction sound on the sides of the abdomen below the in-

sertion of the diaphragm. This sound is due to the rubbing of the air-containing gastric contents against the dilated stomach. Brenner obtained this sign in the very earliest hours after perforation, even as early as one and a half hours after.

**Comminuted Fractures of the Clavicle.** (*Fractures Comminutives de la clavicule.*) A. MOUCHET and O. PIZON, Paris. *Paris Médicale*, November 15, 1913.

Comminuted fractures of the clavicle are important, especially on account of the deformity caused by excessive callus, and second, because of the danger of splinters injuring the brachial plexus. The authors have had the opportunity of observing four cases, and these are reported in detail. Two were occasioned by direct violence, but the other two followed a fall on the shoulder. Clinically, these cases showed a marked difficulty in reduction and in keeping the fractured parts in position. This made the physician suspect an intermediary fragment of bone. Even with the x-ray this fragment is hard to see because it is usually placed behind the lower border of the bone. All four cases were treated by an open operation, removal of splintered bone, and wire suturing of the fragments. The results in all the cases were excellent.

**Case of Embolus in the Abdominal Aorta, Operation, Cure.** (*Fall von Embolus Aortae Abdominalis, Operation, Heilung.*) F. BAUER, Malmö, Sweden. *Zentralblatt für Chirurgie*, December 20, 1913.

The patient was 39 years old and had suffered from mitral disease of rheumatic origin for many years. The patient was suddenly seized with severe pains in both lower extremities and paralysis. The pulse was 92, irregular; the skin over the lower extremities was cyanotic, livid, cold and anesthetic. The femoral pulses were impalpable. The diagnosis of embolus of the aorta above the bifurcation of the iliacs was made. Under a general anesthetic the aorta was exposed and was found to pulsate above the bifurcation, but both common iliac arteries were pulseless. After compressing with the fingers, the aorta was opened, exposing the embolus which was easily removed. The embolus was 3 cm. long and was the shape of a bicuspid tooth, each cusp having fitted into the common iliac arteries. The patient stood the operation well and made a perfect recovery.

**Subpectoral Abscess.** Report of a case. C. LEGIARDI-LAURA, New York. *Medical Record*, January 3, 1914.

This is a rather rare condition, but of much interest; first, because it is often difficult to diagnose; second, because the mortality is very high. The abscess may be situated under either the pectoralis major or the pectoralis minor muscles. The starting point of the infection is usually in the axillary or subclavian lymph nodes. The onset of the symptoms is accompanied by high fever and pain in the chest, suggesting a pulmonary condition. Local bulging is a late symptom, especially if the abscess is under the pectoralis minor. This is why the condition is so infrequently diagnosed in its early stages, and why in consequence the mortality (from sepsis) is high. The author reports a case with recovery.

**Operation for Aneurism by Bloodvessel Transplantation.** (*Zur Operation des Aneurysma mit Gefäßtransplantation.*) E. UNGER, Berlin. *Berliner Klinische Wochenschrift*, November 24, 1913.

Unger reports three cases. The first was a popliteal aneurism which he resected and restored the continuity of the vessel by implanting a section of the saphenous vein 15 cm. long, using the Carrel suture. The result was perfect. The second was an arteriovenous aneurism of the femoral artery. The operation necessitated extirpation of the aneurism, suture of the femoral vein and transplantation of the saphenous vein into the defect in the femoral artery. This case also was successful. In the third case, an aneurism of the popliteal artery, transplantation of the saphenous vein was again attempted, but was unsuccessful owing to the difference in caliber between the vessels. Gangrene resulted, necessitating amputation.

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## TREATMENT OF CERTAIN CASES OF PROSTATIC OBSTRUCTION BY CAU- TERIZATION BY THE HIGH FREQUENCY CURRENT.\*

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It seems to me the two points to be established are that it is possible to destroy prostatic tissue by the high frequency current, and that this is a perfectly feasible means of eliminating a prostatic obstruction in certain cases. I wish to present the following clinical observations upon which are based my belief in the affirmative side of both of these questions.

On cystoscopic examination of cases treated by this method, I could see a gray and black necrotic area at the site of a previous treatment, and repeated application of the Oudin current, would produce in each instance a gradual disappearance of tissue at this spot. The most pronounced evidence on this point was in a case of middle lobe of prostatic obstruction. The lobe was of moderate size, could not be brought into one field of the cystoscope, and hid the ureteral orifices from view. No amount of cystoscopic manipulation on my part would bring the ureteral orifices into the field of vision. Treatment with the high frequency current was applied on six occasions, and each time several spots on the surface of this intravesical lobe were cauterized. The cautery action was not deep, but this repeated action so reduced the lobe that after three treatments it could be brought wholly within the field of vision, and one ureteral orifice became visible. After the sixth treatment, the middle lobe no longer existed, but its place was taken by a broad area of white slough.

The efficacy of this mode of treatment in the two following cases previously reported (*N. Y. Medical Journal*, July 26, 1913), is to me a clean-cut demonstration that cauterization by the high frequency current is entirely satisfactory in certain instances. These patients represent different types of obstruction. The histories were of

long duration, both patients were under observation some time before treatment was instituted, neither had had previous treatment, and the diagnoses to my mind were well established. The results were those that I should have been quite satisfied with, had an open operation been performed; and I cannot see that anything had to do with these gratifying results but the cauterizing effect of the high frequency current.

My first case was diagnosed "contracture of the vesical neck." He was a man, 46 years old, and was first seen at Bellevue Hospital in January, 1912. He denied all venereal diseases. For over two years he had had urinary frequency with often nocturnal enuresis, which conditions had become gradually worse. He was under observation for about two months before any treatment was given. By actual record, the patient voided at intervals of one to three hours, amounts varying from two to eight ounces. The urine was perfectly clear. The prostate per rectum was only slightly enlarged. Urethral instruments passed easily, but with always a decided jump just before entering the bladder. Residual urine, tested many times, varied from 26 to 34 ounces, and was never less than 26 ounces. I wish to emphasize that these many catheterizations, four cystoscopic examinations and the passage of large sounds on one occasion did *not* reduce the amount of residual urine. The intravesical aspect of the prostatic border was slightly irregular, but presented no lobes projecting into the bladder. The ureteral orifices were situated about the usual distance from the prostatic border. The bladder was markedly trabeculated, even on the anterior wall. A Wassermann reaction was reported negative and there was no history of syphilis. A very careful examination revealed no evidence of spinal cord disease. As stated, a diagnosis of "contracture of the vesical neck" was made. A group of long villi attached to the roof of the posterior urethra were easily burned away, but as anticipated, this produced no change in the urinary symptoms or residual urine.

In April, 1912, treatment of the posterior portion of the vesical aspect of the prostatic border was begun. The first four applications each of about 3 minutes' duration were given at intervals of approximately 3 weeks to better note results, good or bad. There was a more or less steady reduction in the amount of residual urine, to 9 ounces at the end of these four treatments. After one month it rose to 13, but remained constant at that figure for the next three weeks. At each

\*Read before the Section on Genito-urinary Surgery of the N. Y. Academy of Medicine, October 15, 1913.

cystoscopy, the site of the previous cauterization was clearly marked by the presence of gray and black necrotic tissue, and a distinct depression at this point was evident. On September 25th and again on October 14th of last year, in addition to making further excavation in the posterior region, I burned a small trough in the left anterior, and one in the right anterior aspect, carrying each about a half inch into the prostatic urethra. I question whether these anterior burns were productive of good, and am inclined to credit the subsequent improvement to the widening and deepening of the posterior notch. At any rate, after the first of these two visits, the residual urine dropped to 5 ounces; and after the last one, to  $1\frac{1}{2}$  ounces. Three weeks later it was  $1\frac{1}{2}$  ounces; and six months later, it was still  $1\frac{1}{2}$  ounces. At this visit the patient voided 22 ounces at one time. Needless to say, the symptoms improved steadily during the course of treatment. The enuresis ceased; the patient did not rise at night to urinate; and the interval between urinations in the day time was often six hours. In all, cauterization was done six times, and the total time of application of the Oudin current was about 18 minutes.

The second patient was 65 years old, had had frequency of urination for many months and enuresis every night for six months. At the time of the first examination, October, 1912, he was voiding 6 to 8 times a night and at intervals of 1 to 2 hours in the day, always with hesitation and some difficulty. The urine was perfectly clear; the residual urine, measured on several occasions, varied from 13 to 15 ounces. The prostate per rectum was not markedly enlarged. Cystoscopy revealed a median lobe, but no other intravesical projections of the prostate. This is the case referred to the first part of the paper. Briefly, the Oudin current was applied to this middle lobe on six different occasions; in all  $9\frac{1}{2}$  minutes. The cautery action was not deep, but repeated application caused the disappearance by necrosis of the whole lobe. Three and five weeks after the last treatment, the residual urine was respectively  $\frac{1}{2}$  and  $\frac{3}{4}$  of an ounce. The symptoms were entirely relieved. Recently I heard from this patient (who is out of town) that he frequently goes six, even eight, hours without urinating.

Both of these patients tolerated instrumentation so well, that not even local anesthesia was used. Neither patient had post-operative pain nor hemorrhage of any consequence.

I have at present under observation an old gentleman who had had three cutting operations upon his prostate before I saw him. He had frequency of urination, residual urine varying from 3 to 6 ounces. His prostate viewed through the cystoscope was very irregular and presented a median bar. I first burned away a small lobe of prostate which projected from the left posterior aspect of the prostatic border (and which I thought might have fallen over the vesical outlet during urination), without improving the

symptoms. Subsequent treatment of the median bar has reduced the residual urine to  $1\frac{1}{2}$  ounces, and has produced a well defined excavation in the prostatic tissue. These observations are too recent to establish clinical betterment, but the case illustrates graphically the ability of the high frequency current to destroy prostatic tissue. This patient is still under treatment.

Two patients seen at the Presbyterian Dispensary, with enlargement of both lateral lobes, who had flatly declined operation, I undertook to treat with the high frequency current, wondering whether it would be possible to help them. But both complained so bitterly of any instrumental examination, I gave up after one treatment in each case.

I am far from advocating this mode of treatment for large hypertrophies. The great majority of all cases of hypertrophy of the prostate I believe are much better treated by open operation. With this small experience in the treatment of prostatic obstruction by the high frequency current, I am inclined to reserve it for instances in which a comparatively small portion of prostate at the vesical neck is causing a relatively large degree of obstruction. Possibly it may afford, at least partial relief in other types of cases and may reasonably be tried when there exists some strong objection to prostatectomy. But with the Oudin current, a single cauterization is not deep, and progress made in destroying prostatic tissue is slow as compared with results obtained with papillomata of the bladder.

Prostatic hypertrophy is a condition of slow growth. Frequently the prostate has reached great size before symptoms develop, and only a little additional growth may produce great discomfort. In such a case of general enlargement, one may produce a considerable degree of relief in cauterizing troughs in enlarged lateral lobes, but it is obvious that a recurrence of symptoms might readily be produced by further slight growth of the tumor mass. On the contrary, in the types of cases regarded as especially suitable for the high frequency current, especially those in which the entire obstruction is due to a middle lobe which can be entirely eradicated, the prognosis is certainly excellent.

A very practical consideration always is whether the patient takes kindly to instrumentation. Intolerance to the cystoscope after good local anesthesia may easily turn the tide in favor of operation in a case otherwise regarded as suitable for this simple procedure.

## STRAIGHT DIRECT LARYNGOSCOPY, BRONCHOSCOPY AND ESOPHAGOSCOPY.

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BALTIMORE, MD.

(Continued from February Number.)

### CHAPTER III.

#### ANATOMY AND PHYSIOLOGY OF THE TRACHEO-BRONCHIAL TREE AND OF THE ESOPHAGUS.

##### ANATOMICAL MEASUREMENTS.

*The Larynx.* When the direct laryngoscope is introduced, the tongue is pushed out of the way to bring the epiglottis into view the lingual surface of which appears covered with light pink mucous membrane traversed by several large blood vessels. The edge of the epiglottis presents as a narrow ledge covered with pale membrane, thicker in some individuals than in others. The valeculae are about as distinct as with the mirror. The lingual surface of the epiglottis is not of much interest clinically because pathological lesions are not often located there. Occasionally one sees a tubercular infiltration or ulcer along the edge of the epiglottis which can be successfully removed through the direct laryngoscope. The laryngeal surface of the epiglottis can be satisfactorily examined through the tube by placing the spatula end of the instrument along the upper border which gives a certain amount of bulging below. In this way the writer was able to remove a large papilloma of the right, laryngeal epiglottic surface through the direct laryngoscope. In order to get a good view of the larynx proper, the spatula end of the laryngoscope is pushed down, thus pulling the entire epiglottis forward. The arytenoid cartilages and the posterior wall come into view first. The arytenoid cartilages present behind as opposed to their anterior position in the mirror and appear as rounded or oblong eminences varying in size from a split pea to a grain of corn or even larger in some cases. The posterior wall is smooth and slightly concave posteriorly in the normal larynx. Passing outward, then forward and finally backward to reach the epiglottis are the ary-epiglottic folds internal to which are the fossae innominae which are bounded internally by the false cords. With the direct laryngoscope used by the writer,

one gets a good view of the ventricles of the larynx because no force is used in pulling the larynx forward; they appear as two openings between the false and true cords. The true cords are seen as two white or slightly pink bands stretching from the vocal processes behind to the anterior commissure in front; they approximate on phonation with the tube in position. By tilting the laryngoscope from side to side the subglottic space can be thoroughly examined. With most tubes it is difficult to get even a fleeting glance, of the anterior commissure; with the tube, used regularly by the writer, no difficulty is experienced in seeing the anterior commissure as will be explained under another chapter. The mucous membrane of the larynx is usually of a rosy pink color.

*The trachea and bronchi.* In describing the anatomy of the trachea and bronchi from the standpoint of the bronchoscopist, frequent references have been made to Brunings and Jackson. A correct picture of the tracheo-bronchial tree is of great importance in estimating distance in the removal of foreign bodies. In the location of foreign bodies in the X-ray picture, a knowledge of the external landmarks is absolutely necessary for correct orientation. The tree itself may be described as an inverted Y with a number of branches coming off from the limbs. The trachea is not exactly in the middle line but deviates below towards the dorsum more or less to the right. The arch of the aorta curves around the left main bronchus and passes close to the left tracheal wall causing the deviation of the trachea, which is not often perfectly straight but assumes a slight S shape. The diameter of the trachea is about the same at all points. When a round tube is introduced into the trachea one sees the rings of cartilage appearing light in color, sometimes almost white and the membrane between of a decided pink tinge. The bifurcation or carina divides the trachea into right and left main bronchi which come off at different angles. The position of the trachea somewhat to the right causes the right bronchus to come off almost straight while the left bronchus comes off at a much more acute angle probably 45 degrees. The angle of bifurcation made by the bronchi seldom amounts to 90 degrees. Through the bronchoscope the carina appears as a sharp, whitish ridge becoming triangular in shape as it fades into the walls of the trachea. The direction of the secondary bronchi going to the upper lobes of the lungs is outward and somewhat forward; the variation in the point of origin of them is of importance as from it results a great difference in the length of the two bronchi. The right upper

lobe bronchus may rise at the level of the bifurcation spur or even from the trachea. The left upper bronchus arises much lower down than the right. The right middle lobe bronchus arises some distance below the upper and runs forward. The bronchi to the lower lobes on both sides are known as terminal bronchi and ramify anteriorly and posteriorly like the fingers of a glove. The rings of the trachea number from sixteen to twenty and are open in their posterior third. In the main bronchi the right has from six to eight and the left from nine to twelve cartilaginous rings. Below the origin of the upper lobe bronchi on each side, the bronchi have cartilaginous plates which often coalesce and are scattered over the entire periphery. Their thickness constantly decreases until in tubes of 1 millimetre they are completely absent. This arrangement increases the elasticity and movability of the smaller bronchi which have an important bearing on the removal of foreign bodies. The upper part of the posterior wall of the trachea touches the esophagus. In books on topographical anatomy the bifurcation is said to correspond to the sternal end of the second costal articulation and behind with the spinous process of the fourth dorsal vertebra. In children the numbers would be three and five respectively. Brunings does not agree with these figures. From skiagrams (the dead body being absolutely horizontal and the picture taken from a distance of 200 cm.) the bifurcation in the case of a 12-year-old girl is situated at the lower edge of the first sterno-costal articulation; in the case of a new born child halfway between the first and second articulations; in a 16-year-old girl it approaches the upper edge of the second sterno-costal articulation and in an adult it coincides with it.

#### *Relative Lengths of the Bronchial Tree (Brunings).*

Lengths.	Man. Cm.	Woman. Cm.	Child. Cm.	Infant. Cm.
Trachea .....	12	10	7	4
Right main bronchus.....	2.5	2	1	0.5
Left main bronchus.....	5	4.5	3	1.5
Right trunk bronchus.....	3.5	3	2	1
Left trunk bronchus.....	2	1.5	1	0.5
If the rectilinear distance from teeth to trachea is added.....	12	13	10	12
There is thus as total distance between upper teeth and bifurcation .....	26	23	17	12
And as total distance between upper teeth and lower lobe branches—				
Right .....	32	28	20	13.5
Left .....	33	29	21	14

"In this table the term 'child' implies the age of about ten years. The numbers in this column have only a limited application, because there is, of course, a considerable interval between 'infant' and 'woman.' The autoscopic numbers for infant and child are doubtful because they depend solely on estimates."

#### *Relative Calibre of the Bronchial Tree (Brunings).*

Diameters.	Man. Mm.	Woman. Mm.	Child. Mm.	Infant. Mm.
Trachea .....	15-22	13-18	8-11	6-7
Right main bronchus.....	12-16	10-15	7-9	5-6
Right trunk bronchus.....	9-12	8-11	5-7	4-5
Left main bronchus.....	10-14	9-13	6-8	4-5
Available width of glottis...	12-15	10-13	8-10	5-6.5

"By the trunk bronchus is meant that part of the bronchus below the branches to the upper lobes of the lungs. These numbers in themselves afford considerable scope, but in practice it must be remembered that all parts of the tracheo-bronchial tree are capable of a not inconsiderable power of stretching. I have therefore given rather high values for the available width of the glottis (the width which the tube can traverse) in the case of a child or infant, as compared with the figures of the bronchial tree, because a child's larynx is more expansible. In practicing endoscopy, unless there is a special reason for the contrary, it will be advisable to adhere rather to the lower figures as regards the width of tube, as by this investigation is made less troublesome and the mobility of the tube greater. It may be taken as a rule that a tube of a width that can pass the larynx without difficulty can also enter the two main bronchi. Jackson's statement that a tube of more than 10 millimetres cannot be passed through the larynx 'without risk of injury,' does not at all apply to the sloping tube spatula of my extensible bronchoscope."

In a large number of bronchoscopic examinations, the writer has never observed movements of the trachea and bronchi synchronous with respiration except in young children in whom the lumen of the different parts of the respiratory tree may completely disappear during expiration. As the bronchoscope approaches the bifurcation, the pulsations of the heart become very distinct and almost frighten the beginner with the force of the impulse. The movements occur with the systole of the heart. They are of diagnostic importance because they may be greatly increased in aneurysm of the aorta. The proximity of the pulmonary arteries causes pulsation in the larger bronchi which are sometimes so marked as to produce narrowing of the tubes.

*The esophagus.* The following description of the esophagus is taken from Brunings: "Killian was the first to show that the tonic and sphincter-like occlusion of the superior extremity of the esophagus is confined to the region of the lower border of the cricoid cartilage, where the lowest transverse bundles of fibres of the constrictor pharyngis inferior form a lip-shaped prominence on the posterior pharyngeal wall. This muscular band, whose sphincteric action can only be observed in the living body, thus represents the lower limit of the hypo-

pharynx and the beginning of the esophagus, the walls of which are supported in front by the cricoid plate, behind by the vertebral column, and at the sides by the more or less strongly developed lobes of the thyroid glands. The cervical portion of the esophagus occupies the median line between the vertebral column and the trachea, and with the latter enters the posterior mediastinum. As a rule the thoracic portion of the esophagus, which begins here, now commences to swerve a little to the left of the median line, thus reaching the extramedian position of the pars diaphragmatica. In contradistinction to the statements in the older anatomical atlases, the fact must be emphasized that the esophagus does not wind up the vertebral column like a climbing plant, but that, on the contrary, its course is so straight that in certain circumstances a view of the lumen may be obtained from its commencement almost as far as the cardia.

The direction of the deviation in the thoracic portion is determined in living persons simply by the relation of the esophagus to the neighboring organs; its left wall, and lower down its posterior wall, immediately adjoins the aorta, whereas the trachea, and below it the heart lie immediately anterior. There is a constant physiological curvature of the lower thoracic portion forwards and to the left, which is important to bear in mind in direct examination. Immediately after the region of the bifurcation the esophagus gradually assumes a position in front of the aorta, thus getting away more and more from the vertebral column. The variable degree of mobility of the several sections of the esophagus are of practical importance as regards examination. It is only the region of the upper esophageal orifice which is comparatively fixed, but the movements of the pharyngeal musculature in deglutition, as indicated by the rising of the larynx, show that it must be partly a fixation caused by reflex muscular contraction. As a matter of fact, the passive mobility of this region is considerably increased during anesthesia, so that according to Jackson, the tube can make lateral excursions several centimetres in extent. Lower down the extremely loose tissue of the cavum mediastini admits of a considerable lateral displacement, the amount of which is only somewhat limited in the neighborhood of the bifurcation by its rather more solid connection with the pericardium and the peribronchial connective tissue, while farther still, near the diaphragm, it decreases considerably. The mobility of the second relatively fixed point of the esophagus—viz., the hiatus oesophageus—depends, of course, very greatly on the state of contraction of the diaphragm. In muscular and corpulent sub-

jects, the mobility is always much less than is the case in lean and weakly ones. It almost disappears when the patient strains or breathes convulsively, while, on the other hand, Jackson was able to displace the hiatus by 15 cm. laterally and 5 cm. in a dorso-ventral direction, in a patient who was deeply anesthetized. Gottstein has collected all the literature bearing on the topographical relation of the cardia to the vertebral column, and has thus arrived at mean values showing that its position most often coincides with the ninth, tenth or eleventh thoracic vertebra.

Length of the esophagus. From Starck's summary of the literature on the subject, I find that the anatomical length of the esophagus (from superior edge of the cricoid plate to the cardia) is stated by ten different authors as from 20 to 35 centimetres. The number 25 occurs most frequently and may therefore be taken as the mean value. For practical purposes it is more important to know the several distances, reckoning from the upper row of teeth, because, when using the esophagoscope, they may be a help in orientation and a guide to the location of endoscopic findings. The following table contains the numerical data of Von Hacker, which are based upon a long series of endoscopic measurements. In connection with the figures relating to children, it must be observed that in many cases they only represent a single measurement, so that the individual variations are not shown. Nevertheless, this table serves as a valuable guide, and will prevent any serious error of localization.

LENGTH OF THE ESOPHAGUS.						
	Men.	Adults.		Women.		
	Degree of variation. Cm.	Mean. Cm.	Usual observation. Cm.	Degree of variation. Cm.	Mean. Cm.	Usual observation. Cm.
From teeth to mouth of esophagus . . . . .	14-16	14.9	15	12-15	13.9	14
From teeth to bifurcation . . . . .	23-29	26	26	22-27	23.9	24
From teeth to cardia . . . . .	36-50	39.9	40 and 41	32-41	37.3	38 and 39

Children.						
Age.	From teeth to mouth of esophagus. Cm.	From teeth to bifurcation. Cm.	From teeth to cardia. Cm.	Length of whole esophagus. Cm.	Length of supra-bifurcal part. Cm.	Length of infra-bifurcal part. Cm.
9 days . . . . .	7	12	17	10	5	5
6 weeks . . . . .	6	11	18	12	5	7
3 months . . . . .	7.5	12.5	19	11.5	5	6.5
3.5 months . . . . .	8	13	20	12	5	7
14 months . . . . .	10	14	22	12	4	8
21 months . . . . .	10	15	23	13	5	8
2 years . . . . .	—	—	—	13.5	5	8.5
2 years . . . . .	9	16.5	24	15	7.5	7.5
3 years . . . . .	—	—	—	14	6	8
4 years . . . . .	—	—	—	15	6	9
5 years . . . . .	10	17	26	16	7	9
6 years . . . . .	11	19	28	17	8	9
9 years . . . . .	11	19	27	16	8	8
9 years . . . . .	—	—	—	16	7	9
11 years . . . . .	10	18	28	18	8	10
12 years . . . . .	10	18	28	18	8	10
14 years . . . . .	11	19	31	20	8	12
15 years . . . . .	14	23	33	19	9	10



Most important are the measurements in adults, and especially the knowledge of the fact that in the case of men the cardia may in some be reached 36 centimetres from the teeth, whilst in others the cardia may be 50 centimetres distant. It is found too, that the "normal" distance of 40 centimetres is subject to extraordinary variations. In women the corresponding numbers are 32 and 41, giving a mean of 38. It is important also to know the distance in a straight line between the teeth and the mouth of the esophagus. It does not vary much and is about 15 centimetres in men and 14 in women. The walls of the esophagus are from 3 to 4 mm. thick.

*Movements of the Esophagus as Seen Through the Esophagoscope.* In opening the upper end or mouth of the esophagus no movement of the walls is seen. Further down in the cervical portion very slight if any movement can be noticed. When the esophagoscope reaches the dorsal portion of the tube, the lumen increases on inspiration and decreases in size on expiration. These variations are valuable in showing the operator the direction in which the tube should go. The mouth and cervical portion of the esophagus represent a transverse slit while in the dorsal region the shape is distinctly oval in character.

## CHAPTER IV.

### DIRECT LARYNGOSCOPY.

#### 1. HISTORICAL.

In 1894 Kirstein proposed to examine the larynx directly by means of a special spatula terminating in a pronged end for pulling the epiglottis forward. He published articles and photographs showing the position of the head which simulated some of the positions used now. His source of light was an ordinary mirror or an electric head light. Kirstein must have gotten a good view of the larynx since his spatula was shaped like some used now, but for some reason laryngologists did not adopt his method. It was the case that his instrument was bought but never used. Two years later Killian, profiting by Kirstein's work, placed direct laryngoscopy on a solid foundation by offering to the medical profession instruments of his own device which differed from the spatula idea in that he used regular tubes. His illumination came from an electric head light which Kirstein had devised and for some time this was the only method of lighting the tubes. While Kirstein first thought of direct laryngoscopy, Killian must be given the credit for placing it on a practical basis. In this country Jackson introduced laryngoscopes which carried the light on a light carrier at the end of the tube.

These instruments in the writer's opinion are still the best for larynx work, pure and simple, because they are more easily handled than the latest European idea. The hand light or electroscope of Brunings and Kahler are the latest ideas in illumination. Brunings' electroscope has been described and Kahler's is very similar to it. Mosher's instrument is still another spatula for examining the larynx. With all these instruments direct laryngoscopy has reached a high state of development and there seems no excuse for every laryngologist not to become expert with at least one of the methods.

#### 2. INDICATIONS FOR DIRECT LARYNGOSCOPY.

The indications for direct laryngoscopy are so numerous that the writer feels justified in saying

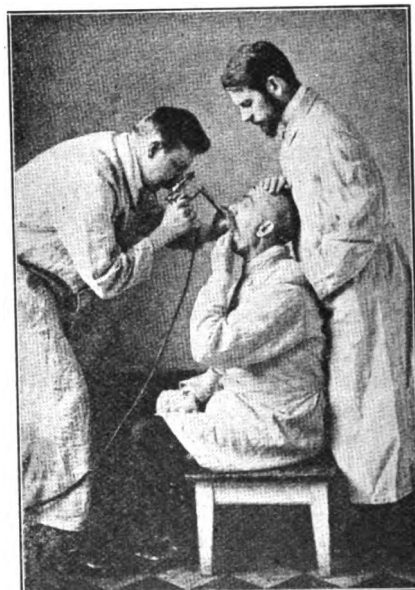


Fig. 1. Stages I. and II.: Recognition and passage of the epiglottis. Brunings.

that the only indication for the mirror or indirect method is in routine office work where time is an element of importance.

1. Those who are expert with the tube will never waste time trying to examine the larynges of children with the mirror. It is not necessary to repeat here the difficulties of seeing the child's larynx with the mirror, for every laryngologist is familiar with them. The tube solves all difficulties by exposing the larynx in a few seconds.

2. Direct laryngoscopy has solved the problem of operating in the child's larynx. In papillomata and stenosis much can be accomplished in a short time as will be shown later on. It can be said absolutely that it is the only method of operating in the child's larynx.

3. In the removal of foreign bodies it is the only method worth while because one sees so much better than with the mirror. The object can be

grasped and manipulated if necessary, which is of importance in some cases to prevent injury of the tissues.

4. In the removal of tumors and specimens for microscopic examination, the operation is more accurately done than with the mirror. Especially in the anterior commissure and on the cords anteriorly is the method of particular value.

5. The examination of the subglottic space is quickly made and pathological lesions seen which would be very difficult with the indirect method. In the same way the ventricles can be explored on the two sides.

6. The extent and limitation of malignant and tubercular growths are often of importance in giv-

ment after the writer's method, accidents are not so apt to happen. But in any case of dyspnea, the operator should be ready to do tracheotomy after which the examination may be proceeded with in safety. It is probably better to examine these patients with the mirror since any instrumentation increases the danger of spasm and suffocation. In one case examined by the writer, the attempt to introduce the laryngoscope caused such marked increase in the dyspnea that it was necessary to perform tracheotomy with the patient sitting.

2. *High blood pressure especially if there are changes in the blood vessels or aneurysm of the aorta.* While direct laryngoscopy is practiced in these conditions, what was said above applies here



Fig. 2. Stage III: Forward pull (with the tube high). Brunings.



Fig. 3. Faulty position (patient slipping forward). Brunings.

ing a prognosis or in deciding as to the advisability of an operation and here direct laryngoscopy is invaluable.

7. In a low hanging epiglottis or an extremely sensitive throat, the mirror sometimes fails even after the use of cocaine. Such patients can be successfully examined with the direct laryngoscope.

8. To get a better view of the trachea than with the mirror, the instrument made by DeZeng is ideal. It gives a good view of the bifurcation. While these indications can be dilated upon, it is not necessary to do so.

### 3. CONTRAINDICATIONS TO DIRECT LARYNGOSCOPY.

1. *Serious Cases of Dyspnea.* With the head in extension as is practiced by some, it is dangerous to attempt the direct examination of the larynx. The application of cocaine is particularly trying to such patients and may result in attacks of suffocation. With the head straight and a smaller instru-

ment in that the extension of the head and the use of a large instrument should be carefully avoided. The writer does not hesitate to examine these patients because, with his method, it is practically impossible to do harm.

3. Failure of compensation in the heart is an absolute contraindication to direct laryngoscopy with any method as is extreme weakness where any operative procedure will do serious harm.

### 4. METHODS OF EXAMINING THE LARYNX DIRECTLY.

1. *The patient sitting.* Under criteria determining the applicability of autoscopia Brunings says: "But if the surgeon takes up his position in front of the patient, who should be sitting with his head moderately bent backwards, it is often possible, by pressing with the spatula in a forward direction, to obtain a view not only of the edge of the epiglottis but also of a greater or less portion of the lingual surface. It may even happen, in particularly favor-

able cases, that by introducing the spatula a long way and exercising a strong pressure a direct view of the arytenoid region may be obtained. This experiment, though in itself unimportant, has a certain importance as a preliminary, and should precede any direct laryngoscopy in order to ascertain to what degree it is practicable. It may be taken as a rule that autoscopy is the more easily performed in proportion to the degree of examination possible with the tongue spatula, but exceptions will no doubt occur. When the neck is short and the glottis is high, it is often very easy to reveal a large portion of the lingual surface of the epiglottis, especially when it is considerably inclined in a posterior direction. Therefore when experimenting with the tongue spatula, it is necessary to notice the distance between the epiglottis or root of the tongue and the back of the throat. If the interval is small and cannot be much enlarged, even by considerable pressure, there will be difficulty in carrying out direct laryngoscopy even when the epiglottis is well in sight. The test with the tongue spatula should not be slurred over, as for one thing it affords a means of judging the endurance and reflex irritability of the patient. A long and slender neck and movable Adam's apple are always more favorable for the examination than a short and stiff neck, strong neck muscles and a short and thick tongue. This is the chief reason why women, children and old people are, in general, much better suited for autoscopy than strong men. One important criterion for the applicability of autoscopy, which will be repeatedly referred to later on and may be mentioned now, is the position of the upper incisors. When they are very prominent it is much more difficult to get the spatula in the direction of the trachea than when they are little developed or absent altogether. A gap of at least two teeth in the middle of the upper jaw considerably facilitates direct examinations."

The writer mentions these views of probably the most expert European laryngoscopist to disagree with them and to state that in his judgment practically every patient can be examined at the first sitting and that without the preliminary use of the spatula. The writer can truthfully say that during the last two years, he has not failed once to get a satisfactory view of the larynx at the first trial with the methods which he will describe later. With the proper position of the head and a small tube, direct laryngoscopy is one of the easiest procedures in surgery in experienced hands. In the Presbyterian Hospital the examination and operation, if one be necessary, are done at the same sitting and

the operation is concluded unless severe hemorrhage compels a second sitting. Having digressed to this extent to champion American methods as opposed to some of the best European, the writer will now describe Brunings' method and then compare it with the methods used in this country. Brunings says: "After the spatula has been fitted to the electroscope, the light arranged, and a damp rag placed ready for cleaning the mirror of the electroscope, if it should be required, the spatula for autoscopy and the mirror of the electroscope should be slightly warmed over a lamp, and all is ready for the actual introduction of the tube. The process may be divided into three stages in the

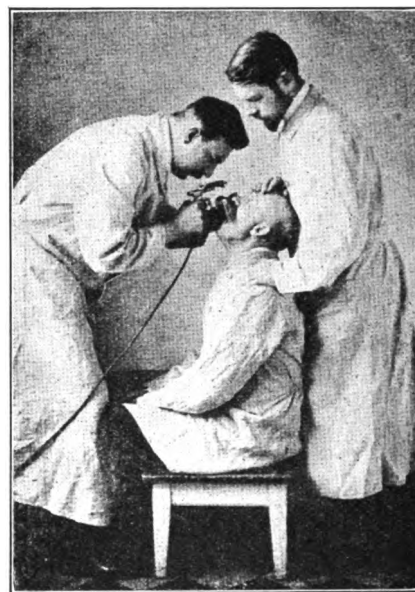


Fig. 4. Stage IV.: Deep introduction. Brunings.

case of all direct examinations of the air passages.

First movement: Bringing into view the lingual surface of the epiglottis.

Second movement: Passing beyond the epiglottis and pushing it aside.

Third movement: Pushing the tube deeper, possibly through the larynx.

*First Movement.* It is better to proceed as follows: The patient should bend his head back very little, and should hold his tongue fast with his left hand to prevent it moving inconveniently. The surgeon should then introduce the spatula exactly in the middle line, not too vertically, so that when the tongue is depressed the upper edge, *i. e.*, about 5 to 7 centimetres, of the epiglottis comes into view. The surgeon's eye should remain all the time close over the slit in the electrosopic mirror.

In order that the spatula, while being pressed down, may not slide off laterally or downwards

from the raised tongue, and in order that the lips and teeth of the patient may be protected from pressure, I urgently advise the surgeon to proceed as follows in all direct examinations: The left forefinger should push up the upper lip until the thumb which is pressed against the forefinger, finds a secure support against the upper row of teeth. The tube should be introduced in the angle formed by the thumb and forefinger, in such a manner that the thumb prevents lateral displacement, while the forefinger protects the teeth from pressure and serves to guide the tube when it is introduced farther.

This manipulation, which even inexperienced operators very easily acquire, is much safer and less trying to the patient than the introduction of a finger into the mouth and the vain endeavor to find a support from the movable soft parts. Moreover, this method, owing to the position of the finger, alone enables the teeth to be protected from pressure or even from contact with the tube. It also entirely does away with the strong friction which, in any case, the teeth exert upon the tube, as it is possible to control the advance of the tube quietly and progressively with the forefinger. To return to the introduction of the tube, after the free edge of the epiglottis, which is often only attained after having pressed down the tongue at various places, has been brought into view, the end of the spatula should be slightly raised, and passed under the control of the left hand, over the epiglottis for about 2 centimetres exactly in the mid-line, so that it has altogether moved about 8 or 10 centimetres inward.

*Second Movement.* I now come to the actual autoscopic displacement. The patient should let go his tongue and lean his head back a good deal more. At the same time, while keeping exactly to the middle line, the surgeon should exert powerful pressure in a forward direction on the root of the tongue, but should not allow the tube, which is resting in the angle between the thumb and forefinger to move in any deeper. What has to be aimed at is rather a purely rotary motion about a horizontal axis situated in the middle of the spatula, together with a gentle forward pull.

It is very advisable during this autoscopic displacement to make the patient utter a continuous sound. This not only diminishes the tendency to pressure, but also renders orientation much easier. For whereas the back of the throat, which is immediately in view, affords no useful landmark, the arytenoid cartilages which then enter the field of vision show at once, by their symmetrical vibra-

tions, if the tube has swerved from the medial plane, and this deviation can consequently be corrected while further displacement is proceeded with.

The amount of pressure required in order to bring successively into the field of vision the arytenoid cartilages, posterior commissure, the vocal cords and the anterior commissure, varies exceedingly in different individuals, as will be seen farther on. On the average it amounts to about one-half the pressure which the hand of a strong man is, in fact, capable of exerting in that particular position (10 kilogrammes). As the root of the tongue is capable of supporting considerable pressure, there is not much danger to be apprehended even in the case of a beginner, provided that he avoids lateral deviations, and, above all, does not introduce the

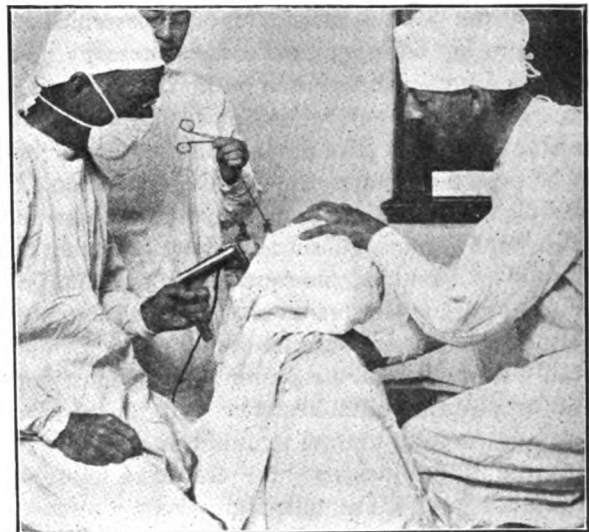


Fig. 5. Positions of patient, operator and assistant for direct laryngoscopy in the sitting position. (Jackson.)

tube too deeply. If a short autoscopic spatula is used, it is practically impossible to enter the sinus piriformis. Whenever there is any doubt, it is better to hark back and begin again with the first movement.

*Third Movement.* The deeper introduction of the tube and the passage of the glottis no longer belongs to laryngoscopy proper. Nevertheless it may become necessary to increase the depth to which the tube is introduced in the second stage by 1 or 2 centimetres, and this can easily be accomplished without friction to the teeth by gradually moving the left forefinger forward. This, in fact, constitutes laryngoscopia subglottica, and affords an opportunity of examining the subglottic space, the hinder wall of which can be sufficiently inspected by merely elevating the spatula sufficiently. It is particularly easy to get a view of the lower surfaces of the vocal cords if the spatula is inserted obliquely

in the corner of the mouth. This will be dealt with farther on."

Brunings' method has been given verbatim in order to compare it with the American methods which seem much simpler. The method used by the writer is certainly easier and just as efficient for operative procedures. The unpopularity of tube work is due to the complicated methods of examination. The different methods devised in this country will now be taken up both in the sitting and the prone positions.

*The usual method of direct laryngoscopy in the sitting position.* The writer wishes to emphasize the fact that the examination is always easier in the sitting than in the prone position in adults.

The method to be described may be called direct laryngoscopy with the head in the Boyce position with the patient sitting. It was described by Jackson in his book on tracheo-bronchoscopy and, so far as I know, is still used by him. The patient is seated on a low stool—so low that when the operator stands in front of him, the instrument can be passed with the elbow and the hand in the same plane. This is a very important point for if the stool is too high successful work cannot be done. The next step is cocainizing the pharynx with a curved applicator. After waiting a minute or two, the laryngoscope is passed straight down between the incisor teeth, pushing the tongue into the floor of the mouth. The head is extended more or less according to the size of the instrument. With the large Jackson tube the head must be thrown far back. The tube slips along the tongue until the epiglottis comes into view. Usually at this point more cocaine must be applied through the laryngoscope by means of straight applicators, the anesthetic being carried straight down into the larynx. By depressing the handle, the spatula end of the instrument is made to slide along the wall of the pharynx about a half or three-quarters of an inch. The handle is then raised bringing the spatula end forward and pulling the epiglottis forward with it. At this point one must pull considerably to see the larynx at all satisfactorily, and in many cases it is impossible to see the anterior commissure. With such a large instrument in some cases it is impossible to extend the head sufficiently to see the larynx. For this reason the writer soon gave up the large laryngoscope and tried the small instrument devised by Jackson for children. This tube is more easily introduced and works better in most cases but it was too large for some patients. The difficulties of holding the tube with one hand and operating with the other are great. Jack-

son advised that the larynx be exposed by manipulating the instrument and not by using force, but this did not work with the writer. In expressing the above views the writer wishes it understood that they are his own opinions and it is quite probable that others do not agree with him in his estimate of the Jackson tubes. The unsatisfactory results in direct laryngoscopy led the writer to experiment with the purpose of finding an easier method and one which could be used satisfactorily in every patient. In conversations with different laryngologists, he found that their troubles corresponded with his own. The great difficulty with all laryngoscopes is their large size which compels an unnatural position of the head and unnecessary and painful pulling on the instrument to accomplish any results. Long ago the writer found that it is just as easy to see through a smaller tube and, with a little practice, as easy to work through it. Besides, the ease of introducing the smaller tube and the absence of strain on the patient more than made up for the difference in size of the tubes. The laryngoscope to be described is the smallest one made and also the most satisfactory to those who have used it or have seen it used because it removes all natural difficulties of the operation and makes direct laryngoscopy almost as easy as the indirect method. The instrument is used in adults and children for laryngoscopy and the examination of the upper end of the esophagus and thus does away with a multiplicity of instruments which is the bane of tube work. It has solved all the problems of direct laryngoscopy for the writer and he commends it to laryngologists as the simplest of all instruments. The important point in working through a small tube is in training the eye to the proper perspective and this is soon learned. One finds that the work through a small laryngoscope helps him greatly in operating through the still smaller bronchoscopes. Before dismissing the comparison of laryngoscopes, just a word as to their illumination may be said. However brilliant Brunings' electroscope may be for bronchoscopes, the writer believes from personal experience that the open tube with the light at the end is better for direct laryngoscopy. The light is bright enough for all purposes and one has the advantage of the open tube to operate through which is an advantage. In laryngeal work the mirror arrangement of the Brunings instrument is in the way of the large forceps which are generally used for operative work in the larynx. The instrument which the writer uses in all his short tube work is a modification of the old Jackson tube

—the first one he devised for children. After the separable specula appeared, it fell into disuse and was no longer made. The original instrument was 17 centimetres long and 10 millimetres in the inside diameter. It had a drainage tube which was practically never used and took up valuable space in the tube. The handle had no vertical part as the separable specula possess so that it was not possible to exert any leverage on it. In modifying the instrument, the writer had the drainage tube removed and a vertical handle attached which can be removed as may be necessary. The detachable handle makes the instrument doubly valuable as will appear later. The tube has been described at length because those who have seen it in operation become enthusiastic at its ease of introduction and exposure of the larynx.

*(To be continued.)*

## POST-OPERATIVE THROMBO-PHLEBITIS.

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Post-operative thrombo-phlebitis was classed by the late Maurice Richardson among the "Unavoidable Calamities Following Surgical Operation." Its occurrence after celiotomies is a most distressing complication, because of the potential embolism; but the prolonged period of convalescence, and the more or less disabling sequence to the patient, also make the subject of large importance in the perfection of surgical recoveries.

From a wide range of statistics, thrombo-phlebitis follows in 1.2% of all abdominal operations. The veins chiefly involved are the external iliac, the common iliac, the femoral, the saphenous, the mesenteric, and the portal.

(a) Klien<sup>1</sup> reports 70 cases of post-operative thrombo-phlebitis in 5851 gynecologic operations performed in ten years. Over one-half of these followed celiotomies, and one-third followed myomectomies.

(b) Schweininger<sup>2</sup> reported 22 cases of femoral thrombosis in 1315 cases in four years at the Munich Hospital for Women's Diseases.

(c) Albanus<sup>3</sup> found 53 cases in 1140 laparotomies, and of these 26 were in non-septic cases; the remaining 18 cases included 6 cases of pyosalpinx and 12 cases of septic lesions in the abdomen.

(d) In a series of 7130 gynecologic operations in Kelly's Clinic, Schenck<sup>4</sup> reports 48 cases of thrombo-phlebitis. In this series four followed perineal operations alone. The cases of fibroid tumors in

this series, although but ten per cent., supplied over one-third of the instances of thrombosis. That only one case of thrombosis occurred in the entire series of operations done for pelvic inflammation, would indicate that infection plays a small part in the etiology.

(e) Sonnenburg's<sup>5</sup> series of 1000 operative cases of appendicitis yielded 20 cases. Of these 9 followed simple catarrhal appendicitis; 4, the gangrenous, and 7 the perforative type. In 17 of the 20 cases the thrombi were located in the lower extremities, 1 in the vena cava, and 2 in the portal system; 9 on the right side, 6 on the left side, and 2 on both sides.

(f) In 3334 cases of appendicitis quoted by Howard<sup>6</sup> there were 29 cases of thrombosis.

In 1000 cases of appendicitis at the London Hospital<sup>7</sup> it occurred in 12 cases, the left femoral vein being affected in 11, the right in 1.

In 400 appendicectomies at St. George Hospital analyzed by Tebbs, there were 8 with thrombosis.

(g) In the collected statistics then of 5734 cases of appendicitis with 68 cases of thrombo-phlebitis, there is an incidence of 1.2%.

(h) Finally, in this entire collective series of 21170 celiotomies, there were 261 cases, or the same incidence of 1.2% post-operative thrombo-phlebitis.

The etiology of this condition is dismissed briefly by most writers, either as obscure, or as due to hemic origin, trauma, or infection, but no intelligent prophylaxis may be practiced without a sound theory of causation.

A study of the statistics in this large series of cases makes clear a few definite facts:—

1. Post-operative thrombo-phlebitis occurs almost exclusively after abdominal operations.

2. It occurs frequently in clean cases—without the pre-operative or post-operative presence of demonstrable bacterial infection.

3. It occurs in about one-third of all statistical cases in myomectomies.

4. In the great majority of cases it occurs in the femoral vein and on the left side.

Several theories have been advanced as to the exact etiology, but from a consideration of statistics, it is very doubtful whether any one cause, be it chemical, traumatic, or bacterial, can be ascribed in all cases. Certain predisposing physiologic factors, however, are present in all cases:

The peripheral venous circulation is comparatively sluggish.

The venous coats are thin and permeable to microbic infection.

Venous blood presents a greater coagulability.

<sup>1</sup>Read before the Mississippi Valley Medical Association, New Orleans, La., October 24, 1913.



The superficial distribution of veins submits them to outside pressure and injury.

Large varicosities in the lower limbs afford a predisposing cause.

The veins of the lower extremities are often dilated and their walls diseased by the pressure of intra-abdominal tumors or inflammatory masses.

Kelling<sup>8</sup> has recently done special experimental work along this line, and concludes that infection is the *prime cause*, arising either through a low grade infection in the natural clot behind a ligature, which disintegrates and is carried in the circulation to other points where thrombi develop, or from stitch abscesses where infection travels directly through the superficial or deep epigastric veins to the femoral or iliac vessels.

Clark<sup>9</sup>, from clinical and experimental work, concludes that traumatism during operation exerted upon the deep epigastric vein, causes the primary thrombosis which slowly progresses through the vessel until it reaches the external iliac, where it gives rise to a retrogressive thrombus in the femoral vein.

Traumatism of the pelvic tissues, during extensive operations upon the vagina, rectum, cervix or perineum, rarely gives rise to a thrombo-phlebitis. However, in Cordier's<sup>10</sup> series of 232 cases following abdominal and pelvic operations, 9 followed vaginal hysterectomy for cancer, and 8 followed vaginal operations, their character not stated. It has occurred rarely following curettages and perineorrhaphies.

Let us consider briefly the anatomy of the pelvic venous system. The uterine and vaginal plexuses empty into the internal iliac. The hemorrhoidal veins terminate in the internal pudic which empties into the internal iliac. The superficial epigastric empties at right angles into the femoral; the deep epigastric and deep circumflex iliac into the internal iliac immediately above Poupart's ligament. It is clear, then, that infections following operations upon the rectum, perineum, vagina, or upon the uterus, ovaries, tubes or broad ligament, if carried by the veins might *rarely* produce a septic thrombosis of the portal vein, but *usually* a septicemia or a pyemia.

The frequency of puerperal septic thrombo-phlebitis has recently been studied<sup>11</sup>. Williams estimates that one-third of all women dying of puerperal infection showed septic thrombosis. Lennhartz placed it at 50 per cent.; Trendelenburg the same, and Kneise somewhat less. Seegert established the fact that these thrombo-phlebitic processes are, in the majority of cases, pure; in other words,

confined to the veins. In 31 cases he found only 5 times a combination of thrombo-phlebitis with lymphatic processes, the rest being pure pyemia.

From our present knowledge we must conclude, then, that there are two undoubted primary factors: Traumatism of the abdominal wall, especially of the superficial and deep epigastric veins; and secondly, deep or superficial infection of the abdominal incision, which is carried by the epigastric veins to the iliac and femoral veins, forming respectively a retrogressive or a metastatic thrombus.

From a consideration of the clinical symptoms these two theories are wholly tenable. The condition arises usually from 7 to 21 days after operation, giving time, in either event, for the slow retrograde formation of a thrombus, or a metastasis from the disintegration of an infected clot. It is evident that a certain amount of thrombosis occurs behind every vein that is ligated. It is then quite conceivable that in certain individuals when the chemical or cellular constituents of the blood have been altered by disease, the coagulability increased, with the vascular disturbances due to anesthesia, and the blood changes due to the ether intoxication, there may be fertile fields for thrombus formation, either from trauma or infection.

The preponderance of thrombosis in the left femoral vein is difficult of explanation, particularly when it follows an appendectomy or cholecystectomy. It can be accounted for by metastasis as when the infection introduced in a dissecting room puncture of the index finger is followed by a thrombo-phlebitis of the left femoral vein. (Chaicot)<sup>11</sup>. Such "leaps" must be accounted for by bacterial colonies filtering through the pulmonary plexuses and gaining the arterial circulation until they find their way to a traumatized or diseased vein wall. It is possible, of course, that a thrombosis in the epigastric veins through their anastomoses might lead to the formation of a retrograde thrombus in the left femoral.

It is needless to consider the familiar symptomatology, but based upon the etiology just discussed, we may perhaps gather clearer and saner methods of prophylaxis, for thrombo-phlebitis is indeed occasionally of serious import when metastatic emboli give rise to pleuritis, pneumonia, cerebral apoplexy, and to pyelophlebitis—all, of ominous, if not fatal, consequence.

Improved aseptic technic, with an absence of wound infection and stitch abscesses, will eliminate one evidently material factor in causation. In the ligation of veins, long dead spaces within the vessel should be avoided by clamping and

tying as distal to the operative wound as possible.

Subjects with flabby skin and musculature, and with poor heat action, should, whenever possible, receive preliminary treatment by massage, hydrotherapy and tonics. The prolonged use of retractors, particularly the self-retaining varieties, should be avoided, for undoubtedly a considerable amount of traumatism to the vein walls is caused by prolonged and rough retraction. It is likewise probable that needless sponging and wiping of the cut tissues adds to this traumatism.

In my last series of 200 celiotomies I have had three cases of thrombo-phlebitis, all of the left femoral.

CASE I. Female, age 28. Large uterine fibroid. No history of inter-menstrual bleeding, slight menorrhagia, no anemia, general health good; operation time 42 minutes. Sub-total hysteromyomectomy, primary healing, no fever after third day. There was, however, unusual tenderness over the abdominal wall though without fever. Undoubtedly at this time the left deep epigastric vein was thrombosed and painful, this finally reaching the femoral and on the 8th day pain appeared in the left popliteal space, with chill and fever. The femoral vein became tender and whip-like. Bed convalescence lengthened five weeks. Some edema persisted for several months. This was undoubtedly a retrograde thrombus of low grade infection.

CASE II. Female, age 22. Bilateral salpingectomy and appendicectomy; no drainage. Hemoglobin 80 per cent. No fever after 5th day, but complained of tender abdomen. Stitches removed on 9th day, primary healing. On 13th day temperature rose to 103°, with chilliness and pain in left leg. This rapidly became edematous and was constantly painful. Fever continued for five days. Bed convalescence extended four weeks. Complete restoration in four months. This was probably another infected retrograde thrombus from deep epigastric veins.

CASE III. Female, age 42. Chronic adherent appendicitis. Musculature flabby. Condition impaired by recent childbirth. Operation time 18 minutes; no retractors used. No post-operative fever. Stitches removed 8th day, primary healing. On 15th day pain and swelling of left lower limb, moderate edema, no chills or fever. Complete subsidence in three weeks. This is one of the puzzling cases; although undoubtedly of metastatic origin, it was a low grade infection without chill or temperature manifestation.

The post-operative management of the patient may influence the formation of thrombus.

Early and adequate bowel action should be secured whenever possible, for the pressure of a heavily loaded sigmoid upon the iliac vessels might easily slow the venous current sufficiently to aid thrombosis. The position in bed should be

frequently changed from side to side, and often to the abdomen, thereby lessening venous stasis in the extremities.

It has been my routine for some years in most celiotomies to give a large rectal installation of salt solution on the table, and usually eight ounces every three or four hours afterward, until water can be freely tolerated by the stomach. In this way the fluids of the body are constantly re-enforced through the pelvic plexuses and kept from stagnating. The free post-operative administration of morphine, which was formerly quite general, no doubt aided other factors in thrombus formation.

The preventive treatment may be summed up in strict asepsis, and the avoidance of trauma. However, there will still remain a few cases due to obscure constitutional dyscrasias and unavoidable endovenous infection against which we have at present no available means of prophylaxis. It is quite possible that at some future day metastatic infection may be demonstrated as arising from the mouth, lungs, kidneys and intestines.

Surgical intervention, except in acute septic thrombo-phlebitis, usually of puerperal origin, is in most cases contra-indicated. The brilliant achievements in the puerperal varieties form another chapter, but in passing we may pay tribute to the pioneer work of Trendelenburg, Freund, Lenhartz, Williams, Jeff Miller and others.

In conclusion, let me say, that when the problems of post-operative adhesions, and thrombo-phlebitis have been solved, surgery will have come more triumphantly into its own.

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#### PURGATION FOR DIARRHEA.

The good results of purgation in all acute and benign cases are too familiar to need further emphasis. Our experience in this series of cases goes to support the traditional belief that purgation, by means of castor oil or magnesium sulphate, is second only to rest in bed as a remedy for diarrhea. We have seen no special reason to prefer one of these two purges to the other. Either is usually efficient.—RICHARD C. CABOT, in the *J. A. M. A.*

## THE ETIOLOGY, PATHOLOGY AND TREATMENT OF PHLEBITIS.

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Phlebitis is defined as inflammation of the vein. Therefore in studying this pathological condition we must consider two things; namely the structure of the tissue in its normal attitude, and how the various forms of inflammation affect this structure. Before the subject can be properly covered we must review the anatomy, histology, and physiology of veins in general.

### ANATOMY.

Veins are vessels which serve to return the blood from the capillaries of the various parts of the body to the heart. Two distinct sets of vessels make up the venous system; namely the pulmonary, and the systemic.

The pulmonary veins are concerned in the circulation of the lungs. Unlike all other veins these contain arterial blood on its way from the lungs to the left auricle of the heart.

The systemic veins are the ones concerned in the general circulation and convey the blood from different parts of the body to the right auricle of the heart.

The portal vein is a large appendage to the systemic circulation which collects the venous blood from the digestive organs. It is formed by the union of the superior mesenteric, splenic, inferior mesenteric and gastric, the *venae portae*. This vein ramifies through the liver tissue, reappears as the hepatic and empties this blood into the inferior vena cava.

Nearly all veins have valves arranged singly, in pairs, or groups of three at variable distances. This is especially true of veins of the lower extremities, where the valves are more numerous in order to support the flow against the weight of the column of blood itself.

Here and there we find veins minus these blood-column-supporting valves, as in the smaller venous canals.

The spermatic veins have only a few valves, and they are entirely wanting in the *venae cavae*, hepatic veins, portal vein, renal, uterine and ovarian veins.

The structure of the tissue through which veins pass has much influence upon the power of the vein to carry a column of blood. Such support for the veins has little fat and loose connective tissue while, on the other hand, the firm elastic tissue and muscle aid the movement of the blood.

### HISTOLOGY.

Veins are composed of three coats, internal, middle, and external. The internal coat is made of endothelium, the middle coat of muscular tissue, and the external of connective or areolar tissue. The amount of these various tissues differs in veins of modified size and position. In this connection we must remember that veins are passive channels of circulation, and for this reason the muscular coat is not heavy.

The endothelium of the intima is oval in form, supported upon a connective tissue layer, consisting of a delicate network of branched cells covered by a layer of longitudinal elastic fibers only occasionally fenestrated.

The middle coat, or media, is composed of a thick layer of connective tissue with elastic fibers, interrupted by a transverse layer of muscular fibers of which the white element is generally in excess. The outer coat or adventitia is made up of areolar tissue with longitudinal elastic fibers, which in the larger veins is from two to five times thicker than the media. The muscular coat or media is wanting in such veins as the maternal part of the placenta, in the venous sinuses of the brain, veins of the retina, and the cancellous structures of bones.

The valves of the veins are formed by a reduplication of the intima, strengthened by connective tissue and elastic fibers, both surfaces being covered with endothelium. On the surface next to the wall of the vein, these cells are arranged transversely while on the surface over which the blood current flows, they are placed vertically following the direction of the current, and are of semi-lunar form. The concave margin of these valves is free and they lie close to the venous wall when the current flows normally. When there is an impediment in the onward flow, however, these edges flare and open to support the blood column.

### PHYSIOLOGY.

So far as a vasomotor nerve supply is concerned we find that the veins as a whole are lacking in this innervation. However there are exceptions to this statement and it has been clearly proven by Mall that the portal vein is so supplied from the splanchnic fibers. But as far as the liver itself is concerned, the portal vein in reality plays the part of an artery and this may be the reason for Nature's variation here. It has also been shown by Roy and Sherrington that vasomotor nerves supply the large veins of the neck. Other exceptional and localized nerve supply to veins has been partly shown by others, as Thompson and Bancroft.

Pulsation in veins is not normal, as the transmis-

sion of force in the blood column is usually lost in the pre-capillary channels. However, arterial dilatation may transmit by increased blood pressure (arterial) a pulse wave to some veins. The term venous pulse should apply to a different phenomenon, namely, that seen in the jugular vein. This is due to back pressure from the heart, of which close approximation is the cause. When the flow through the right heart is impeded we observe such a pulse wave as Mackenzie has outlined very carefully.

On the whole, venous physiology is a wide field for investigation and proof. We do know, however, that veins carry impure blood to areas where it may become oxygenated and returned to the arteries for distribution.

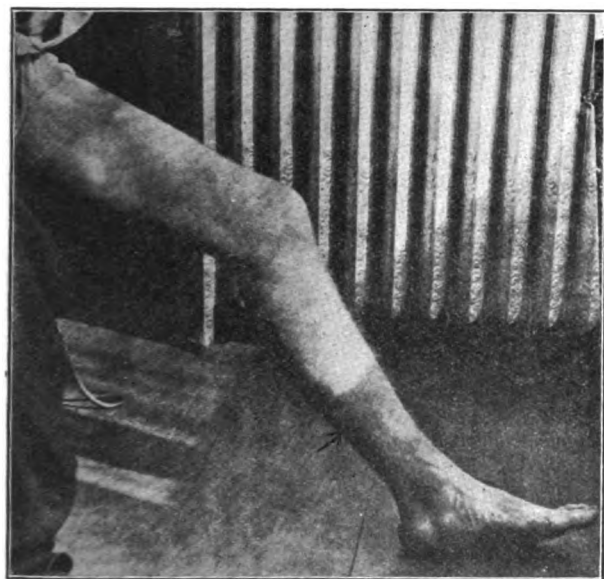


Fig. 1. Case after operation for vein stripping. Internal method used. Arrows point to short incisions necessary. Note the smoothness of the skin.

#### ETIOLOGY.

The following is the result of personal observation in fifty carefully studied cases. In each case full histories were obtained as to social data, family history, past history, including past illnesses and present illness, and general physical condition.

The etiology of phlebitis, so far as any one definite organ is concerned, cannot be plausibly given in any narrow sense of the word. Under a general heading the fifty cases herein reported show that two general etiological factors come strongly to the front: first, acute infection of the intima following a localized infection distant from the vein or veins involved; and second, a degeneration, not infective in origin but rather the result of occupation, malformation, lack of structural support or deviation in line, with a final result showing some form of de-

generation beginning in the intima and extending to the other coats of the vessel. This latter form may involve only the inner coat of the vein or, if of long standing, the other two coats may become partially or completely involved. The result of the observation of these fifty compiled cases would lead us to believe that we can most readily classify our phlebitis cases into the acute, subacute and chronic types.

Forty of these cases showed that proper living, good wholesome food, care of the skin by regular bathing, and freedom from alcohol were things lacking. These forty cases were from the slums and the patients knew little of the happiness derived from right living. Thirty of these forty patients, or 75%, were alcoholics to a greater or less de-



Fig. 2. Same as in Fig. 1. Note the freedom from prominent superficial veins.

gree; twenty, or 66.6% of these thirty cases were regular toppers, indulging principally in beer, gin, ale and whiskey, but seldom to the point of intoxication. Of these thirty cases with alcoholic taint twenty-three, or 76.6%, were men, while the remaining seven, or 23.4%, were women. All of the men belonged to the laboring class, most of them working out-of-doors as shovelers, teamsters, furniture-movers, bill distributors, etc. The remaining ten cases, non-alcoholic or abstainers in type, were made up of two female adults, three male adults, and five children under sixteen years of age. Of these children two were females, aged six and ten years, three males aged nine, twelve and sixteen years. Each one in this class of ten cases belonged to families of high social standing and living under exceptionally good hygienic conditions. So far as

diet is concerned, this group of ten cases of high social standing showed that high living, excluding alcohol, was a prominent feature. Sweets and pastry, highly seasoned roasts, gravies rich in fat and a flour paste mixture, luncheons at frequent intervals especially in the cases of the children, were admitted to be a part of the regular diet. Two of the males in this division admitted excess in sexual gratification although gonorrhea and syphilis was denied by them all.

Tobacco was indulged in by twenty of the twenty-six males, a percentage of 76.9. Of these twenty males who used tobacco eleven both chewed and smoked (55%) while the remainder (45%) only smoked, using cigars and the pipe.

The histories of these cases show that of the entire number the following was shown to be the daily working capacity of each individual. Of the adult males, twenty-seven in all, ten worked on a scale of eight hours per day, five averaged ten hours daily, and the remaining twelve worked on a variable scale as far as hours were concerned. Of the adult females, ten were housewives and worked from early morn until late at night, averaging possibly sixteen hours per day. The remaining five were women of high social standing, not taking part in the housework to any extent, yet were up until very late at night. They would not arise early in the morning, however, and obtained all of the sleep required, and at times were inclined to remain in bed too long. The eight remaining cases were children who obtained regular sleep and recreation. Thus it is shown that 20% of the patients worked on a scale of eight hours per day; 10% worked ten hours per day; 24% labored mentally or physically until their work was finished, some extending their labors into the late hours of night; 20% were housewives and worked early and late; 10% were women who favored themselves with a bountiful amount of sleep although not at regular periods; 16% were children and averaged well so far as sleep and rest were concerned.

Upon inquiring into the past history of the various cases it was discovered that twenty, or 40%, had had *typhoid fever*. It was surprising to me that so large a percentage should have had this illness. That no error might have been made inquiry, for confirmation, was made the second time with the same result. I saw three of these cases during the progress of the disease and all of the confirmatory tests were positive. Of these three typhoid cases one, a female, age thirty-seven years, developed a typical phlebitis. The remaining seventeen cases revealed the fact that during their

sickness, seven of them had developed severe pain in the lower limbs, and the part became very tender, sensitive to touch or weight of bed clothing, and they told of having their limb elevated with the part wrapped in cotton or flannel and artificial heat applied. These were undoubtedly phlebitides per sequele to the typhoid.

Thus it is seen that eight of the twenty typhoid cases had undoubtedly developed a phlebitis of the lower limbs, the femoral or saphenous veins being the seat of infection. In the one case which I observed during the activity of the causative factor the internal or long saphenous vein of the right limb was involved. Of the seven remaining cases, three stated that the right leg was the one affected, one stated that the left lower limb was involved and the



Fig. 3. Marked varicosity of lower limb in woman of advanced years. Note the tortuous course of the venous channels.

remaining three cases could not recall the precise location stating only that it was in one of the legs.

By these figures it is seen that of the eight cases having typhoid fever as a causative factor, four (50%) had the veins of the lower right limb involved, one (12.5%) had the left lower extremity involved, the remaining number undetermined as to which limb suffered the sequela. Taking the cases as a whole eight (16%) showed that the bacillus typhosus was the organismal causative factor. Osler states that three to four per cent. of typhoid cases develop phlebitis as a sequela.

One of the patients in this series gave a history of having had *pneumonia* ten years previous. He stated that during the progress of the disease he developed great pain in the left leg. At this time he was told that he had inflammation of the veins in

the affected part. Thus pneumonia may be an etiological factor in phlebitis. It seems doubtful however, that 2% of a larger series of pneumonia cases would show this sequela.

Ten of the fifty cases in this series had a *rheumatic tendency* shown either by actual joint involvement, follicular tonsilitis, pleurisy, or excess of uric acid in the urine. Of these ten cases four had had phlebitis of the lower extremity and one of the right arm and forearm.

That uric acid excess and deposit had some influence in bringing about this condition could not be questioned. Eight of the ten cases gave a history of having had fever during the rheumatic attack. The five phlebitis cases were in the list that ran a fever. Fifty per cent. of the rheumatic cases in this series showed phlebitis, while twenty per cent. of the whole series of cases showed rheumatism.

It is interesting to note that eight of the ten rheumatic cases had fever and that all of the phlebitis cases were in this group. This might be corroborative evidence to bear out the infective origin of rheumatism, so putting it into the group of bacterial diseases. While this is far too small a number to pass accurate judgment upon, it would go to show what might be expected as an etiological factor in rheumatics.

None of the cases in this series showed any signs of active tuberculosis. A few, the number being five, gave a sparse family taint. On the whole, however, this disease did not play an important rôle in any way whatsoever.

*Scarlet fever* contributed two of the cases in this series. One, twelve years of age, was convalescing very satisfactorily, having nearly completed desquamation, when he suddenly developed severe pain in the abdomen and the temperature rose to 103.5°. This abdominal pain was not localized at any time and was not accompanied by tympanites. The predominating signs and symptoms were continuous pain, all over the abdomen, muscular rigidity pronounced, thighs continually flexed upon trunk, and continued high temperature. The first thought was that we had a case of fulminating appendicitis superimposed by perforation and the consequent peritonitis and abscess formation. However, consultation advised watching because the trouble was not localized, tympany was absent, the bowels moved regularly without assistance and the patient did not seem extremely sick. The differential diagnosis was most interesting and could be made only by very careful exclusion of other conditions. After much conservative thought the case was decided as one of phlebitis of the portal system of veins, prin-

cipally the inferior mesenteric, gastric and splenic involving its many minute tributaries. I could find no report of this condition recorded, yet it was without doubt as diagnosed. The case was prolonged and the temperature remained elevated for ten days, but finally the patient made a happy and complete recovery. I feel sure that this case will appeal as most interesting to any who might study such a condition. The other case in which phlebitis complicating scarlet fever, developed it in the right forearm. The condition never became serious or systemic and the patient made a good recovery.

Of all of the fifty cases twenty-three had had scarlet fever. This would give a percentage of 8.6 of scarlet fever cases developing phlebitis. This would undoubtedly be high when considering phle-



Fig. 4. Varicosity of the dorsum of the foot and internal lateral surface of the ankle.

bitis as a result of scarlet fever alone. This series would allow that 4 per cent. of phlebitis cases were a result of scarlet fever.

*Septicemia* and *Pyemia* were a predominating factor in this series of cases. Fifteen cases had at some time in life developed septic fingers, hands, forearms, mural abscesses, etc. Everyone of these fifteen cases showed marked venous involvement, and two showed at necropsy very markedly thickened venous walls, fibrin deposit upon the intima and, in one case, a suggestion of vegetations. Although these two cases are not criteria yet I can hardly do otherwise than believe that few cases of septicemia can exist without some phlebitis as an accessory accompaniment. Each one of these fifteen cases showed marked venous engorgement about the area of involvement. I believe that the



phlebitis begins as an intrinsic factor before the intima becomes involved. In other words it appears to be a local condition as a result of continuity rather than a metastatic one until in the later stages.

This series gives septicemia as a cause in 30% of phlebitis cases. I believe that this percentage is none too high. In fact, wherever septicemia or pyemia result fatally I believe that venous involvement could be demonstrated in every case at necropsy where the condition had existed for more than three days. Osler mentions that arterio-sclerosis is a most common terminal condition of septicemia. Is it easy to believe that channels running in such close approximity would escape the association of evils? Another argument in its favor is the very frequent cardiac involvement following septicemia, demonstrated as pericarditis or endocarditis. John W. H. Eyre himself brings forward the frequent occurrence of septicemia. Keen also describes phlebitis resulting from septicemia and terms this condition septic, non-pyogenic phlebitis.

Thus it is seen that what the laity know as "blood poisoning," is the cause of phlebitis in one form or another in nearly one-third of all the cases. In this series ten were male and five female.

*Malarial fever* was found in one of the cases. It was the intermittent type and occurred in a male, age forty-five. This patient had the general cachectic appearance, and the parasite was demonstrated in the blood current. Occasionally he would develop a marked tenderness in the lower limbs or now and then in the forearm. At such time the part involved would be swollen, red and hot, pain being very much in evidence and continued in character. These attacks of extremity involvement would always accompany the activity of the disease and would subside with it.

While I realize that a long series of malarial patients might not show phlebitis as a complication, yet I feel it proper to include this case in the percentage etiological list. It gives malaria as a two per cent. cause.

*Syphilis* played a somewhat important part in this series of cases. Ten of the patients had had this disease; seven had acquired it and three had inherited it. Three of these cases showed acute symptoms in the form of redness, swelling, heat and pain in one of the lower limbs. The remaining seven cases showed themselves in the form of varicosity of the veins or phlebectasis. Three of these instances of varicosity occurred in the abdominal wall, the remaining four cases having the lower limbs involved. In some of the later cases the phlebectasis extended up to and upon the inner as-

pect of the thigh. A peculiar fact exists in that everyone of the syphilitic cases showed signs of phlebitis in some form.

I believe that this disease stands out as a much more important etiological factor than would at first be considered. Although in none of these luetic cases could the venous involvement be directly attributed to the disease, no other cause could be found. It is fairly safe to assume that this trouble was the result of specific infection.

Many conditions have been laid at the door of syphilis because of lack of proper backing in looking for some other etiological factor. It is felt, however, that if every syphilitic case could be taken to the post-mortem table, few would pass as not having venous involvement in some part of the system.

Any number of cases might have venous involvement the result of an acute condition elsewhere, yet in each case I believe that syphilis would play its part in another area of the venous circulation. In the future of syphilis, its affection of the veins may be prevented, by the early use of salvarsan, from going further than superficial lesions. But only time, careful observation and the compilation of proper statistics will reveal the truth of this hypothesis. Be that as it may, syphilis has certainly stood out in the past as a most important factor with an end-result shown by its action on the venous circulatory channels. These series would go to show that twenty per cent. of all phlebitis cases could be traced directly or indirectly to specific origin.

The *puerperal state* is another condition to be considered in looking for a causative factor in phlebitis. During pregnancy the ovarian and uterine veins become greatly distended and thus might be regarded as undergoing a physiological, temporary, hyperplastic phlebitis. As time goes on and delivery has taken place these veins are left filled with blood, the column being poorly supported both within and without. What a fruitful field for trouble, if the least bit aggravated! Such an aggravation does occur now and then resulting in a very grave condition. Following all deliveries there is a rise in temperature whether or not any degree of infection has taken place. Where this fever comes from is perplexing at times. After careful consideration we cannot but assume that absorption or auto-intoxication must play its part, when signs of infection are absent.

Of the fifteen female adults in this series, three cases showed the following symptoms and signs always within forty-eight hours after delivery (the

time alone eliminating the probability of sepsis as the causative factor). Each one of these cases began by complaining of acute, intermittent abdominal pain. Intestinal gas as a cause was eliminated. This painful condition would soon be supplemented by a more or less sudden rise in temperature to 102° or 103°. The bowels would be slightly constipated and no other special signs or symptoms would develop. The patient would seem extremely sick, however, yet lactation had begun normally.

One of these cases comes up very emphatically to my mind. This was the case of a woman who had moved to New England from Pennsylvania. At the time of transportation she was seven and one-half months pregnant. Upon arriving at her new home she began to work with much vigor. Stretching, stooping, etc., soon told on her, and she



Fig. 5. Varicosity of the leg showing cicatrix of previously ulcerated skin area. Note evidence of pending recurrence.

was taken ill. Within a few days she delivered the premature child, a well-developed little girl. The child died within a short time. Within thirty-six hours the mother's abdomen became distended, severe pain developing in the hypogastrium, the bowels were hard to move and there was frequent micturition. Consultation was held and the diagnosis of phlebitis was made. The unfortunate patient died within the next sixteen hours.

The remaining two cases in this class were recorded as the previous case. One died, the other recovering after a very much lengthened convalescence. The mortality of this class of cases in this series is 66.6%, a very high mortality, yet such as is generally conceded from the reports in our general literature. This series of cases would show that 6 per cent. of phlebitis cases were of the broad

ligament type following parturition. It might be of importance to state that the case in which recovery followed developed after a self-instituted abortion.

*Mechanical, occupational and postural Phlebitis* will conclude the etiological discussion in this paper. Keen has so well outlined the causative influence of these matters that but brief mention will be made of them. The form of phlebitis brought on by these influences is one not included in the infective class or as secondary to any particular disease. In other words, we have a condition commonly termed *varicose veins*. This is, however, a true phlebitis of a chronic type due to three factors: lack of proper column support through absence of valves; a granular or fatty degeneration resulting from overweight or overtaxing of the muscular system; continued over-distension where valves are plentiful and fatty or granular changes in and about the vessel walls are absent, yet atrophy of the fibrous elastic tissue results. This in reality is an asthmatic condition of the venous channels.

Eleven of these cases were seen, five in female adults and six in male adults. Of these eleven cases, seven had the condition very marked in the lower extremities, two had the veins of the abdo-

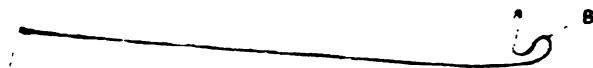


Fig. 6. The author's improvised instrument for the internal stripping of veins. Referred to in descriptive section of article.

men involved, the remaining two had the condition commonly known as varicocele.

Of the seven leg cases, four were in females and three in males. Each one of the women had delivered two or more children and could trace the beginning of the condition from this. The three males were robust, two being motormen on street car lines, while the other was a janitor and elevator man. The two abdominal wall cases were in females and laid their trouble at the door of pregnancy, one having delivered three children and the other six. Each had a very markedly relaxed abdominal wall and the veins could be very readily emptied by onward pressure or milking motion.

The two varicocele cases had been troubled with the condition for years. One had been a professional bicycle rider in earlier life, the other had had orchitis twice, with a long interval, following gonorrhea.

It is seen that 22 per cent. of the phlebitis cases in this series come under this head. I believe that this percentage is none too high. This, though a chronic form, is none the less important. In fact from a social point of view these cases require quite as much attention as do the acute types. They are

troublesome and often limit a person to certain forms of activity and occupation.

Below will be found a table compiling the etiological statistics in condensed form.

ACUTE PHLEBITIS.				
Etiology.	Locality.	Age.	Sex.	Pctage.
Typhoid fever	Lower limbs	9 to 43 yrs.	5 male 3 female	16
Pneumonia	Lower limb.	33 yrs.	1 male	2
Rheumatism	Lower limb, arm and forearm	11 to 61 yrs.	3 male 2 female	10
Tuberculosis	.....	.....	.....	0
Scarlet fever	Portal vein, fore- arm	10 to 12 yrs.	2 male	4
Septicemia	Varied	17 to 51 yrs.	10 male 5 female	30
Malaria	Lower limbs or forearm	38 yrs.	1 male	2
Syphilis	Lower limbs	20 to 48 yrs.	6 male 4 female	20
Parturition	Broad ligament	22 to 35 yrs.	3 females	6
CHRONIC PHLEBITIS.				
Mechanical, Occupational, Postural.	Lower limbs Abdominal wall Spermatic cord	19 to 39 yrs.	6 male 5 female	22

#### HABITS AND SURROUNDINGS.

Alcoholic	.....	23 to 68 yrs.	23 males 7 females	60
Tobacco	.....	19 to 57 yrs.	20 males 27 males	40
Adults	.....	.....	15 females	84
Children	.....	.....	4 males 4 females	16
Improper Hygienic Surroundings.	.....	Variable	29 males 11 females	80
Proper Hygienic Surroundings.	.....	Variable	2 males 8 females	20

#### PATHOLOGY.

In dealing with this phase of phlebitis we must consider the condition in its varied stages and include briefly the pathological standing of the surrounding structures. It also becomes necessary to consider each coat of the vein and cover the variation in the changes therein.

With any of the acute phlebitis cases we are necessarily dealing with structures within which the changes have come about more or less rapidly. There are redness, swelling, heat and pain. Taking each one of these signs individually, they can be summed up pathologically as follows.

**Redness.** This objective sign carries with it the pathological circumstance of an increased blood supply as the veins are found greatly distended and over-supplied with blood. Each coat of the vein has been overtaxed and tired out. No longer can we consider the condition otherwise than a passive one as far as this distention is concerned.

The internal coating or lining of endothelium resting upon its base of thin connective tissue has become pressed out so as to be more transparent. The middle or muscular coat has undergone a true atrophy and the unstriped muscle fibers are found to be thin and, at times, here and there, they are wanting. The external or areolar structure of the veins is soggy and saturated with serum containing many polynuclear leucocytes and red blood cells.

**Swelling.** This pathological feature is due to two factors, namely, the stagnation of the blood

current and the infiltration of the cellular and fibrous elements. The structures are soft, they yield readily beneath the knife blade, and leave a wet surface upon the cutting instrument; blood serum, abundant red blood cells, and polynuclear leucocytes are present; the whole structure resembles a spongy mass; the vein bends easily and will not return readily to its former pose; the structures through which the vessel runs become doughy and soggy; free fluid can be milked from this tissue in a greater or less amount depending upon the length of time the disease has been present. Often small thrombi are found within the lumen of the vein and occasionally we find a complete occlusion of the vessel by a semi or fully organized blood clot. The lethargic circulation allows such

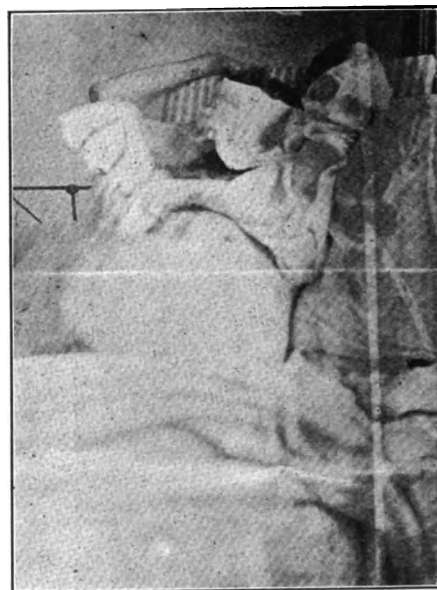


Fig. 7. Varicosity of the abdominal wall. The umbilicus forms the radial point. The prominence of the abdomen due to ascites.

complete osmosis of the serum that the surrounding structures become twice their normal size and the extra room for this fluid must necessitate great swelling. The skin over this area can be readily pitted upon pressure.

**Heat.** The elevated temperature varies very much and in the majority of cases is local. This is not true, however, in those instances where a specific organism has caused the trouble or in the post-partum phlebitis of the broad ligament. Where the rise in temperature is not general the altered circulation probably accounts fairly well for the increase in heat. Thermogenesis and thermolysis being unequal or the relation between the two being materially disturbed causes a runaway condition. Here the sympathetic control over the local thermic condition goes hand in hand with the vasomotor in-

nervation. When the hand is placed over the skin surface covering the area the intense heat can be readily felt as compared with skin areas elsewhere. Thus we expect a local rise in temperature in those cases not due to a specific organism.

However, where a known organism is present and has brought about the trouble there is no reason not to believe that the general system has become tainted. Here we find the higher thermic center affected and the resulting general systemic reaction resulting in an elevation of the temperature.

In this class of cases the temperature line will be found more or less irregular with the regular morning remission and evening rise. Of course the degree of rise and fall must vary with the extent of involvement, the time the disease has been running and the virulence of the organism. The post-partum broad ligament involvement will generally run a very high fever with but slight morning remission.

The chronic phlebitis cases run no fever unless superficial ulceration has developed and infection has taken place. In fact many times these cases will, by tactile sense, show the involved area to be cooler than other parts of the body.

**Pain.** All acute phlebitis cases have considerable pain. This pain is generally continuous, throbbing in character, and very distressing. A peculiar fact is that often morphine and other narcotics seem to have but little effect. Many theories have been advanced concerning the pathology of this pain. None of them seems to be satisfactory in every instance. On the contrary, because of the numerous theories now existing, it would seem that we are still unsettled. I firmly believe that the severe pain exhibited in these cases must have its direct origin in the very fine superficial and deeper nerve endings. Such a conclusion is drawn from the fact that the pain is invariably continuous and many times throbbing in character. If the larger nerve trunks were involved, the pain would be more intermittent and throbbing would not be present. Again this pain will often increase very gradually in intensity reaching what might be termed a, *high tide of endurance*. The area over which the pain extends may also increase from day to day and any superficial pressure has a marked tendency to temporarily aggravate the condition so far as the direct pain is concerned.

Admitting these facts as we must, because we find them constant, it seems proper to assume that the increase of blood supply to the part, distending the veins to their limit, the osmosis and diffusion resulting in induration not only of the venous walls but

also of the surrounding soft structures, must of necessity stretch and tear the minute nerve endings. This mutilation of these minute nerve filaments, being constant, results in the severe pain. It is just such a condition as we find in the man who has over-exerted his muscular system and by so doing gets very sore and lame. Each move elicits severe pain and he is aware of its presence for some time or until these nerve endings again heal. Authorities agree upon the pathology of pain from this source and it seems very reasonable to compare the two favorably upon the same plane. Taking this hypothesis as reasonable we must draw the conclusion that such pain can come from this condition, and from a negative or exclusion point of view it would stand the test.

(To be continued.)

## EPILEPSY SURGICALLY CONSIDERED. A PRELIMINARY CLINICAL REPORT.

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Two varieties of epilepsy are clinically recognized, viz., (1) the so-called idiopathic, essential or genuine; and (2) the secondary, Jacksonian or traumatic.

It was formerly believed by certain observers that in the first variety there exists no external cause, that the disease begins in the ganglionic cells, and that the convulsions are symptomatic of the cerebral cell changes. Later researches, however, especially the results obtained from surgical intervention in epilepsy, have caused a decided modification of former conceptions, and at present (probably more among surgeons than neurologists) the cell change or ganglionic cell degeneration is interpreted as the effect rather than a cause of the disease. For several years Kocher and Freidrichs have attributed the sequential spasms to increased intra-cranial blood pressure, and have regarded the cell changes as end results.

The favorable outcome accruing from radical surgery in the treatment of epilepsy has induced the belief that all cases originate from traumatism or disease of early childhood; bacterial or toxic stimulation in the latter producing such changes in the cerebral cortex as to cause periodic discharges of energy from these cells. Opposed to this view, however, is the difference in the inception and character of the convulsions in so-called idiopathic

and the Jacksonian type of epilepsy. In the latter there is usually a definite aura; whereas, almost invariably in the former a sharp cry precedes the convulsion.

In essential or general epilepsy the muscular contractions are at first tonic but later become clonic, the entire body being involved; whereas, in the traumatic or Jacksonian type only a portion of the body participates. Based upon these obvious clinical facts some observers (particularly neurologists) have designated as "epileptoid" all types not truly essential in character, *i. e.*, the cases in which possible causative factors, such as trauma, encephalitis, etc., can be demonstrated, are not recognized as true epilepsy.

Since operative surgery has resulted in the discovery of causative cerebral lesions in such a large percentage of cases, and since pathologists have demonstrated the almost constant presence of degenerative changes in the giant pyramidal cells of Betz (found only in the precentral convolution), even where a deeper growth or other gross lesion may have constituted the primary causative factor, the hypothesis has been markedly emphasized that even so-called idiopathic epilepsy is dependent upon traumatic or other recognizable (although possibly undiscoverable) causes.

In the surgical treatment of epilepsy, while neither the Kocher valve operation nor the excision method originally suggested by Horsley offers a large percentage of complete cures, if a limited number of these unfortunate patients can be permanently relieved and others distinctly benefited by the invocation of surgery, are we not amply justified in giving them the opportunity of possible benefit? And, granting this premise, is it unreasonable to hope the opportunity thus afforded for study of the brain on the operating table may reveal pathology which is not terminal, and open avenues of increased promise of relief to individuals hitherto utterly and hopelessly condemned as beyond assistance? As a rule the epileptic ends his days most miserably, his life is a distress and a reproach, and not infrequently existence is terminated by suicide, when, except for this affliction, the individual might be a useful member of society.

While in epilepsy of the Jacksonian type complete and permanent relief by surgical intervention cannot be promised in any individual case, the outlook for betterment is so much more favorable than in the essential variety that the surgeon is justified in advising his patient to submit to operation. This type of epilepsy can usually be recognized by the aura which always precedes the convulsion, and by

the regular manner or progressive sequence in which muscle group involvement occurs. These phenomena, however, must not be confused with the status hemi-epilepticus which sometimes accompanies idiopathic epilepsy. The seizure always begins in the same muscle group, progressing to other centers on that side, then crosses and involves the opposite side in regular sequence.

If one exclude the cases presumably owing their origin to so-called reflex causes, such as adherent prepuce, eye strain, etc., it will be found that in all others there exist definite changes in the cerebral cells. These changes may only be demonstrable microscopically in the giant cells of Betz, or there may be merely cell degeneration due to toxicity, as from alcohol, lead poisoning, etc. The anamnesis may have to be extended backward to the date of birth; trauma from delivery forceps may have eventuated in fracture or intra-cranial hemorrhage; later cerebral injury may have been inflicted by a blow, a stone, or a fall. Operation may reveal adhesions between the dura and an old fracture line, or exostoses may be found present; there may be scar tissue within the dura, or if subdural hemorrhage occurred a cyst may be found. Again, there may be a history of encephalitis, or of cerebral symptoms following some of the infectious diseases. The presence in the calvarium of neoplasms, abscesses, or hydrocephalus, may cause epilepsy of the Jacksonian or even the essential type, from pressure because of lessened intra-cranial capacity. Therefore, all cases must be carefully studied as to type, and more particularly as to cause.

As already intimated, in the Jacksonian variety of epilepsy, surgery offers the patient some hope of relief, and as in other surgical affections the earlier the operation is undertaken the greater the possibility of lasting benefit; and, with the discovery of removable tumors, cysts, scars, etc., this is especially true, even although the presence of such lesions may have been unsuspected prior to operation. It must be borne in mind, however, that the discovery and surgical removal of a definite lesion does not always foreshadow complete cure nor even permanent improvement. Therefore, I do not wish to be understood as expressing the opinion that in all cases epilepsy can be cured by surgical intervention, nor that every patient so afflicted should be subjected to operation; but I would urge the most careful clinical investigation and study of every case, and if there exist no distinct contraindication to operation, that the patient be given the opportunity which affords a definite

probability of benefit with the possibility of complete and permanent cure.

In all instances where the causative factor is one of those mentioned in the foregoing paragraph, early operative intervention is distinctly advisable. As in other surgical diseases, delay means further involvement, with extension of cell degeneration, increased physical and mental impairment, and lessened possibilities of permanent benefit from any method of treatment.

My preference in the surgical treatment of epilepsy is the plan suggested by Horsley, viz., excision of the so-called epileptic area in the cerebral cortex. Based upon his experience and results in Jacksonian epilepsy Krause insists that, even though there be no history of trauma and no gross lesion noted in the brain, nevertheless the area in the precentral convolution in which the attacks begin should always be excised. In connection with the performance of this operation, however, a few notes of warning should be mentioned. It is of the utmost importance that asepsis be irreplaceable, as the slightest infection may result most disastrously. Haste has no place in cerebral surgery, and too much should not be attempted at one sitting. It is advisable, therefore, to perform the operation in two stages, *i. e.*, merely lifting the bone flap at the first séance, and postponing dural incision with isolation and excision of the offending area for eight to ten days. Nothing can be lost by pursuing this plan, and the life of the patient may be gained.

In searching for the area epilepticus, it is best to use stimulation by unipolar faradization, placing a large pad as one pole over the abdomen or chest. The battery and electrodes which I employ for this purpose were made by Meyer, of Chicago, Illinois. The battery is so regulated that a very weak current may be produced. For stimulating the centers only the weakest current is permissible. It is best tested by the tongue, and the electrode should merely impart the faintest saline taste. After being tested, the electrode is exchanged for one exactly similar in size and shape which has been aseptized. Stimulation must not be too prolonged not too often repeated, otherwise the centers may be exhausted or the stimulation may produce a status epilepticus possibly resulting in death of the patient upon the table.

The administration of bromides or other sedatives, continued for a variable length of time after operation, is necessary to insure the best results. In the majority of cases tonics will also be required. In but few instances do the attacks cease at once,

as the surgical procedure does not "act like magic." Usually the convulsions gradually subside, and post-operative attention therefore becomes necessary.

I wish to also sound a note of caution as to what may be reasonably considered as a cure. Certainly six months or a year without an attack cannot be regarded as a permanent cure of epilepsy. To say that a patient is entirely well, in my opinion at least five years must have elapsed without a seizure. This is a feature which should not be overlooked, as not infrequently epilepsy remains quiescent, or at least the patient may enjoy freedom from convulsions, for a variable length of time, it may be weeks, months, even a year or more.

With the foregoing explanatory remarks, my views concerning the surgical treatment of epilepsy should not be misunderstood; and to further illustrate some of the points outlined the subjoined case is reported. When first observed the patient was an object of commiseration, being the most abject looking individual I have encountered for a long time. His expression was idiotic, and his intellect was so impaired that he could hardly answer the simplest questions. It was believed at the time that possibly his condition might be partially due to the enormous quantities of iodides and bromides he had been receiving, and notwithstanding which he had been having several epileptic convulsions daily. He was sent to the hospital and operated upon according to the method to be described. The history is as follows:

Date of observation, October 19, 1912; patient referred by Dr. Frank Simpson. A. S., male, aged fifteen years; occupation (until May, 1912), packer for a large paper company.

Family history, so far as patient knows, negative for epilepsy. Father died of heart disease; mother living, apparently in good health, but has frequent severe headaches persisting one to three days. Two brothers and two sisters (twins) living and well, patient being oldest child in the family.

Personal history: Had diphtheria when quite young; otherwise, the mother says he was perfectly well until the age of eleven years. In 1908 (when eleven years old) patient fell from a swing and struck his head, he says "behind and below the crown." A small scar is noted on right side of head one and a half inches behind a line connecting the ears and two inches from the longitudinal fissure; another two-inch scar on a line with the first, but one inch in front of line connecting ears. Patient was strong and well prior to the fall mentioned, but claims he "has had frequent severe headaches as far back as he can remember," the duration being one to two and a half days. He thinks he had the first convulsion with loss of consciousness about a week after falling from the swing. Several slight



epileptic attacks occurred in 1910, which he says were preceded by "a feeling of dizziness or swimming in his head." Even after severe seizures supervened there were no distinct prodromal symptoms until December, 1911. Since then he says the attacks begin by his "seeing people or animals—tigers, elephants, lions, foxes—coming after him to catch him and rut him." Just as he is caught by one of the animals (the lion most frequently) everything becomes blank. He does not know when nor where the convulsive movements begin, but has been told the movements are first noted in the left arm. Following an attack he is drowsy and weak for five to ten minutes, but after walking around a little that he feels better. He says he has never bitten his tongue nor given a "cry" at the beginning of a seizure, nor was either noted while he was in the hospital. There is no especial weakness in any limb following a convulsion—all being extremely weak.

During the first year (his 11th year) three to four seizures occurred daily, and during his 12th year about the same conditions prevailed. From the age of 13½ years to the present time he has had two or three attacks per day three or four days each week. He says the seizures appear less severe than previously, and he feels less exhausted thereafter; duration of each attack one to three minutes. Although his appetite has been fairly good, since May, 1912, he has lost 22 pounds in weight. The bowel function is regular, and urination normal, *i. e.*, five or six times in twenty-four hours. Pressure at junction of the parietal and occipital bones causes slight pain above both eyes.

October 20th, 1912: Slight epileptic attack; unconsciousness; clonic convulsions involving muscles left side of face and left arm; mouth drawn to left more than the right; attack not seen by nurse. The mother says she has never witnessed the beginning of a severe convulsion, that in slight attacks "the left side seems to draw up, the body being bent over to left side," but the duration is so brief that she has never noticed particulars. Patient has been taking bromides three years without improvement. Urinalysis shows urine normal, and blood examination reveals nothing abnormal.

Operation, October 28th, 1912. Osteoplastic flap as preliminary stage of excision operation. On right side of skull over motor area there was made an osteoplastic flap, six openings bounding a quadrilateral area being drilled with Hudson's instrument. The two openings at summit of flap were connected with Gigli saw, the lateral openings by means of Dalgren's forceps, and the base of the flap then fractured. The dura pulsed and seemed to be under increased tension. The osteoplastic flap was replaced, and the skin incision sutured with No. 1 plain and chromic catgut.

On November 18th the second operation was undertaken, consisting in excising the motor area of left arm in which the spasms invariably began. The osteoplastic flap was quickly elevated, the dura incised along each side and at the base of the cranial opening, and the dural flap turned upward. Condition found: Edema of arachnoid (moderate). The veins appeared larger than normal, and along

their course white bands of fibrous tissue were noted. The capillaries were especially prominent. Punctures were made in the arachnoid, and a considerable quantity of fluid was evacuated. Mild faradic stimulation of precentral convolution was then practiced, the focal areas of shoulder, arm, fingers, extension of hand, leg and foot, and part of face centers, being definitely located. The motor area of the arm center was excised 6 m.m. deep. The dura was then sutured and the flap replaced. The skin wound was closed with catgut and a dry dressing applied. Hemorrhage from the scalp incision was effectually controlled by an encircling buttonhole or lock-stitch, similar to Heidenhain's hemostatic stitch which is sometimes employed for this purpose. The surgical steps were executed under light chloroform anesthesia.

On November 22nd there was slight paresis of the extensors of the left hand, and typical wrist-drop on left side; flexion of fingers about normal, that of arm weak. From this time the return of function in the left arm and hand, which had been almost lost following the operation, was exceedingly rapid. For several days after excision of the brain substance there was no recurrence of the epileptic seizures, but ten days later they reappeared notwithstanding the administration of bromides was commenced five or six days after the operation. The latter part of January, or two months subsequent to operation, the administration of ergot and digitalis was begun, and in February the patient had his last convulsion. All medication was discontinued the last of April, and to date (November 20, 1913), he has had no further convulsions.

The foregoing case is not reported as a permanent cure, since it is well recognized that even without treatment an epileptic may enjoy freedom from attacks for six months or a year, and then have a recrudescence. However, it is believed that the history of the patient and details of the operative steps undertaken for his relief possess sufficient interest to warrant this preliminary report.

The difference in the physical appearance of the patient since the operation is most marked. When admitted to the hospital in October, 1912, he weighed only 86 pounds, whereas his present weight is 135 pounds. The greatest improvement, however, has been in his mental condition. When first observed he was a drooling, bromide-saturated, unintelligent looking boy who could not even answer questions; he was completely incapacitated and unable to take care of himself. Today he is a happy, rosy-cheeked, handsome lad, with a bright expression, intelligent and prompt in replying to questions, doing a man's work every day, not only earning his own livelihood but assisting his family.

In conclusion: I cannot refrain from expressing my firm conviction that the wonderful improvement which has been effected in the mental and physical

condition of the patient is principally attributable to the rational application of modern surgical methods, and it is to be hoped that the benefit already derived may not only continue but prove to be permanent.

If such brilliant results can be obtained in only one out of five or even ten cases of this character, certainly greater benefit will have accrued from surgery than we could hope to secure by the administration of drugs; and are we not, therefore, justified in recommending that these unfortunate patients grasp the opportunity of relief which is afforded by surgical intervention? If a few patients can be permanently cured by operation, and the condition of a larger number improved, who will deny them the beneficence of surgery?

#### A NOTE ON THE MANAGEMENT OF BURNS.\*

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There are four things to take into consideration in treating burns, any one or all of which come up in a given case:

First—To combat the shock, if it exists.

Second—To relieve the pain and nervous excitability.

Third—To prevent infection and protect the exposed living tissue.

Fourth—To help Nature in her work of repair.

(1) Shock, which often occurs as a result of severe burns, is treated on general principles too well known to be discussed in this paper. It has been said that "shock is shock," meaning that, regardless of its cause, shock must be treated in the same manner under all conditions.

(2) To relieve pain and nervous excitability I think it best to give a hypodermatic injection of morphine and atropine. The size of dose varies according to the age of the patient and the severity of the case. Then immerse the burned area, if it be an extremity, in cold water to which has been added either a teaspoonful of bicarbonate of soda or common salt to a quart of water. A temperature of about 50° or 60° F. is preferable. If the burned area, on account of its location, cannot be immersed in water, it may be covered with a light, smooth cloth which has been dipped in the solution; then by gently and continuously applying the solution to this cloth the same result will be obtained. This water-bath may be continued for some time, or until the systemic effect of the morphine is mani-

festated. In institutions where trained assistants are always at hand the whole bath may be used and continued for days, if a large area of the surface of the body is burned.

(3 and 4) Protection of the tissues and prevention of infection demand our greatest efforts and must be kept in mind from the first. Nature puts forth her greatest efforts, and the system will exhaust its entire resources to accomplish this end; but Nature cannot prevent the invasion of pus-producing microorganisms. The surgeon may.

I wish to condemn two things often done that are sanctioned by most of our text books. First, the puncturing of blisters immediately after a burn; and, second, the use of carron oil and other remedies of this kind as a protecting dressing. A blister is a non-irritating protection to the delicate underlying tissues, and we can furnish none better. I have never known the raised epidermis to reunite with its base after the blister was punctured. In most cases it acts as an irritant, and for several days following it causes serum to be poured out under the dressings, to soil them and furnish a good culture for any possible pus-producing germ that may be waiting for a chance to assert itself. Within a few days the epithelial cells in the deep glands of the skin will have accomplished their work of repair if properly protected by the blister. If any blisters are accidentally burst, with the epidermis rolled up or displaced to any extent, it is better to remove such epidermis at once.

I consider the following line of treatment the best for preventing infection and protecting the tissues. After the patient is fairly comfortable the bath may be discontinued and the burned area with the surrounding surface sprayed or mopped with hydrogen peroxide. The entire surface should then be mopped with dry gauze. Then apply strips of gauze which have been previously soaked in a 2 per cent. solution of picric acid in dilute alcohol. Over this apply a thin layer of cotton and hold in place with adhesive strips or a roller bandage. This dressing may remain until it is soiled, at which time remove all soiled or wet dressings, clean with hydrogen peroxide, mop dry, and re-apply fresh gauze soaked in the picric acid solution. About the third day open all blisters and mop away the fluid contents, applying a fresh dressing as before.

I think that this is the best treatment for all burns whose severity is not great enough to cause sloughing. If sloughing does occur as a result of charred tissue, or later as a result of infection, the dead tissue should be removed as rapidly as it becomes loosened. Then the underlying exposed sur-

\*Read at the 22nd Annual Meeting of the New York and New England Association of Railway Surgeons.

face is cleaned with hydrogen peroxide, dried, and mopped with the picric acid solution. Over this put strips of rubber tissue that have been kept in a bichloride of mercury solution, 1 to 1000. Then apply the picric acid compresses and cotton as before. The astringent action of the picric acid limits the exudation of serum by constricting the congested superficial capillaries, and does not interfere with the development of the new epithelium. Its antiseptic action prevents infection, and I have never seen any systemic toxic effect. The rubber strips furnish a non-irritating covering for the denuded surface, and do not disturb the granulations when they are removed. If the rubber tissue is applied in narrow strips and the edges permitted to overlap, the dressing will more perfectly congeal to the irregular surface. This dressing should be changed as often as is necessary to keep the surface clean and free from pus.

The treatment above outlined, allowing for modifications in each individual case, is one which I consider most nearly ideal with every degree of this most common accident, from a slight scald to that produced by the most terrific gas explosion.

#### THE ETIOLOGY OF DUODENAL ULCER.

I have long held the view that the diseases of the stomach, duodenum and gall-bladder, with which the surgeon deals, are not primary but secondary. They are the result, in my opinion, of an infection or of a toxemia which has its origin for the most part in some abdominal organ. The experimental work of Turck, of Wilkie and others, strongly supports this view, as does also the knowledge we have of the development of acute ulceration of the duodenum in cases of burns, uremia, pemphigus, erysipelas, operations upon the genito-urinary organs, and many other intensely infective conditions. The evidence has seemed to me to be strongly in favor of supposing that the source of infection in many of the cases of chronic ulcer is in the appendix; in some it is in the small intestine, in some in the large, in some in the pelvic organs of the female, in some in parts outside the abdomen. A routine examination of the abdomen should follow the direct dealing with the stomach in all cases of duodenal ulcer, if the patient's condition permits this to be done with safety. It is remarkable with what frequency one then discovers a serious lesion in the appendix. I therefore make it a practice, with few exceptions, to examine and remove the appendix in all cases of gastric and duodenal ulcer and of gallstones.—B. G. A. MOYNIHAN, in the *Lancet*.

#### THE MANAGEMENT AND CARE OF THE INJURED IN LARGE WRECKS.\*

F. B. WEAVER, M.D.,  
HYDE PARK-ON-HUDSON, N. Y.

The first thought of the railroad surgeon is to reach the scene of the accident as quickly as possible. After the arrival, make general inspection of all the injured passengers and in a general way you may determine the number of passengers injured and the extent of the injuries. Temporary quarters must be provided where the more seriously injured may be taken and cared for.

Usually this is accomplished by turning into use one of the least damaged passenger cars—a sleeping car being preferred, as the berths may be used for cots—and if this car is not damaged it may be taken to its destination without the unnecessary handling of the injured, the one thing which is always to be avoided.

In the meantime a relief train has been ordered out with supplies, surgeons and nurses. Until this relief train arrives the company surgeon is caring for the most severely injured, with the help of the passengers and the trainmen who have not been injured. On the arrival of the relief train it has been my custom to direct the work of the assisting surgeons and so systematize the work that there may be no duplication of medication or unnecessary examination and handling of patients. Frequent transfers of patients from one car to another should be avoided, and when moved they should be placed in a car suitable for taking them to their destination, the company surgeon of the territory and nurses accompanying them, and when possible making subsequent visits.

After the relief trains arrive, and the assistant surgeons are at work, the name, home address, the destination address, number of days to remain there, and the extent of injury, if any, of each passenger should be taken. This list when completed should reach the railroad officials as quickly as possible.

In cases where the passengers are willing and the injuries will permit, the passengers should be allowed to proceed to ticket destination, and in many instances they can, from their hotel or hospital, keep their business engagements. In case of wreck of a local train I would advise those injured to be taken to the hospital, for they would be able to receive better treatment there than in their several homes.

\*Read at the 22nd Annual Meeting of the New York and New England Association of Railway Surgeons.

The welfare in general of all passengers should be cared for, the uninjured as well as the injured. In cases of delay in leaving the scene of wreck, some provision should be made for meals and shelter when necessary.

The following is the report of a wreck occurring at Rhinecliff, October 17, 1909, about 4 A. M. It was a cold, cloudy morning, with heavy fog, and very damp. The wreck occurred very near the station, but, being early in the fall, the fires had not been started as yet, and the station was cold and damp. It was just the beginning of break of day. There was a pitiful sight. One passenger was killed. A Mrs. C. M., of Albany, painfully injured, was just recovering from a long illness of nervous prostration. She decided she would rather return to her home in Albany, and on the first train north I sent her there in care of one of my assistants. Mrs. T. and her five children were not seriously injured, but she was just out of a sick bed, following a miscarriage. The shock and excitement of the accident brought on secondary hemorrhage. You can imagine the difficulty of giving her proper care under the circumstances, but fortunately there was a private car on the train and the owner very willingly allowed one section of it for her comfort, where she was made very comfortable and given good care.

Now, while the injured were being cared for, those who were not injured and those only slightly injured became very uneasy, and some very disagreeable things were said of the railroad company, etc. There was a hotel about five hundred feet from the scene of the wreck, and as soon as possible I had all who could be moved taken there, fires started, and plenty of hot coffee, tea, milk, etc., made ready; also sandwiches, eggs, etc., and all had what they wished. In an hour's time you would not have thought they were the same people. Their feelings had entirely changed. When the relief train was ready all were willing to go through to New York, and had a more kindly attitude toward the railroad company. I went to New York with the train, and with Mrs. T. and her five children to Brooklyn, where I remained until their family physician arrived. She made a rapid recovery.

March 13, 1912, was the date of the Twentieth Century wreck near Hyde Park. Fifty-seven passengers were on the train, and all were more or less injured, none seriously. The ones most hurt were placed in a sleeping car and the injuries dressed until the relief train arrived, where the work was finished. They were all New York passengers and anxious to arrive there.

After dressings were finished these cases were transferred to a Pullman train with dining car and taken to New York, not using the local hospitals. On arriving in New York they were taken in taxis and private ambulances to their homes, hospitals and hotels, having telegraphed ahead from relief train for necessary cabs, etc., to meet train on arrival.

## MILITARY SURGERY.

GUSTAVUS M. BLECH,  
CHICAGO.

*(Continued from the February issue.)*

### GUNSHOT WOUNDS OF THE CHEST.

Such patients who do not recover within a reasonable time (say about two weeks) at the field hospital are likely to remain sick for a prolonged period and may even remain crippled for life.

All such patients are of course sent either to the evacuation hospital or the base hospital where their conditions are treated practically the same as they would be in a civilian hospital.

A discussion of the therapeutic measures to be undertaken there for the relief of chronic empyema, pericarditis, mediastinal abscess, osteomyelitis of sternum or ribs, etc., is therefore, beyond the scope of this serial.

The difficulty of making a prognosis in cases of chest wounds is recognized by civil surgeons. But surprises await the military surgeon, especially in the first few weeks.

The following case is instructive in that respect: A Russian soldier, aged 30, was hit in the right chest at midnight, February 20, 1905. He remained on the field unconscious until 6 A. M. A first-aid dressing was then applied.

He reached the German Red Cross Hospital February 28. Anteriorly somewhat below the second right rib a wound not larger than a pea, allegedly the wound of exit. On the back corresponding to the seventh rib, six fingers breadth from the lamina a somewhat larger wound of entrance. Dulness with absence of respiratory sounds below angle of scapula. Region of liver strikingly painful, liver dulness normal. A swelling sensitive to pressure above umbilicus. Fracture of ribs at the wound of entrance with displacement of fragments. Some rise of temperature.

March 21. Redness, swelling and pain at the place of fracture. Resection of rib under anesthesia, the pleura not being opened.

At first, slight elevation of temperature after operation—normal for the next ten days.

March 31. Dulness has rather increased. Patient suffers from difficulty of breathing.

April 6. Sudden rise of temperature. Air hunger. Aspiration of 69 c.c.m., serous liquid from the right pleura—sterile. The temperature curve resembles that of pneumonia. Then there are at first brief, later longer, intervals which pointed to lung abscess. Exploratory aspiration which was done repeatedly remains without result. No sputum.

April 17. Partial removal of seventh rib in anterior axillary line to enable better drainage of their suppurative effusion. No bacteria could be cultivated.

The patient loses ground and death takes place 106 days after receipt of injury (sepsis).

Necroscopy shows that the lower lobe of the right lung has a leathery consistency. In the upper lobe inflammatory foci. Middle lobe hard and free of air. No abscesses. Spleen enlarged.

The case is highly instructive. First of all the length of time between receipt of injury and death preaches a sermon not easily forgotten. Given a remission after a few weeks rise of temperature and no bacteria in the exudate, only a careful observer will be slow in giving a favorable prognosis. There is no doubt of the fact that this patient died of sepsis (enlarged spleen!). The inflammatory foci in lung tissue after gunshot injuries of the chest, unless there be a pronounced pneumonia, should awaken our earnest attention.

I quote from the records of the same institution another case emphasizing what has been said.

Soldier, shot February 18 by a small-caliber, jacketed missile. Wound of entrance anteriorly over the third right rib. Two fingers breadth from the median line, size of a large pea and round, suppurating. Wound of exit right posteriorly, four fingers breadth from the lamina, two fingers breadth below scapular angle. Soft parts around wound swollen. Weak respiratory sounds. Fever.

Fever increases, as does dulness on percussion and difficulty of breathing. Then gradual improvement subjectively and objectively. The bloody pleural effusion which seems to be the cause of all the trouble proves sterile.

March 24. For the past three weeks almost normal temperature. Suddenly rise. Dulness of right side unchanged, over it bronchial breathing, above it amphoric respiration. Eighth and ninth ribs sensitive to pressure. Liver sensitiveness to pressure striking. Aspiration again produces only sterile effusion, clear and odorless. Sputum as seen in pneumonia. The symptoms disappear gradually May 6. Evacuated by railroad.

We see that we may have sterile effusion and yet the sudden rises of temperature speak for a process in the lungs not always demonstrable either by physical examination or by the characteristic sputum, as happened in the case just cited.

Undoubtedly in many such cases the inflammatory process is central.

The experience of recent wars has also shown that several missiles may hit one or both lungs without producing correspondingly graver symptoms.

Even shrapnel bullets have failed to produce a more serious condition than jacketed missiles of smaller caliber.

With exceptions of the characters above noted modern gunshot wounds of the chest may be looked upon as comparatively benign.

## XVI.

### GUNSHOT WOUNDS OF THE ABDOMEN.

The triumphs of modern surgery as regards the cure of abdominal infections and lesions, the technic of what was considered in former times a *noli me tangere*, but now a comparatively simple affair—the relative safety of laparotomy under modern asepsis have stimulated the minds of great military surgeons to undertake abdominal surgery on the battlefield. Even comparatively recent writers have been very optimistic therapeutically, but the experiences in Cuba, in Africa, in Manchuria and in Thrace, all point to the need of great operative conservatism.

Indeed the pendulum has swung in the opposite direction—many are the voices raised against laparotomy at the front.

It is difficult considering the tremendous amount of clinical material on hand to settle the question of operative therapy for gunshot wounds of the abdomen with one dictum, certain prominent writers to the contrary notwithstanding.

Nevertheless definite rules can and should be formulated for our guidance in the field.

The reason for the diversity of opinion is not obscure. Cases are seen when a small caliber jacketed bullet inflicts a perforating abdominal wound. From the path of the missile perforation of the intestine certainly did take place. The stricken soldier remains on the battlefield unaided for some time. When found and taken to the field hospital an uneventful rapid recovery takes place. Why did this patient get well? Because the small wound or wounds of the partly empty intestine healed by the absolute rest of the helpless body. Nature is performing what surgeons are endeavoring to do by means of intestinal suture. Such cases surely point

to non-operative treatment as the proper course to adopt.

On the other hand a patient is seen with a resulting peritonitis and dies. In such cases one cannot help but conclude that a timely laparotomy may have saved life. It does not necessarily mean that the lethal issue in the last case was due to a different missile or that probably another region of the abdomen has been struck, for it can be asserted from the statistical material on hand *that the prognosis of two cases hit by the same weapon, at the same distance under like conditions and in the same region need not necessarily be the same!*

Under such conditions there remains but one logical conclusion, viz., that while in the frontal stations tactical reasons may force medical officers to adopt a definite scheme of aid of the simplest character in practically all cases of gunshot wounds of the abdomen, at the field hospitals, individualization to meet the conditions as they appear clinically, is justifiable. *(To be continued.)*

#### ANOCI ASSOCIATION IN OPERATIONS.

The brain being a tissue of surpassing delicacy, is damaged with wonderful facility by injury and by fear and worry. The good risk patient when operated by almost any method by almost any surgeon of experience, will recover from his operation, but the delicate nervous organization is only too frequently shattered by the experience. We now understand why. Though the principle is clear, the technique demands to a certain extent a re-education of the surgeon; it demands a certain amount of detail and precision; it demands far more consideration for the patient; but through anoci the destiny of a patient is to a greater degree placed under the control of the surgeon, who through it is enabled to reduce both the morbidity and the mortality.—GEORGE W. CRILE in *The Southern Medical Journal*.

#### THE PSYCHIC STATE OF THE SURGICAL PATIENT.

There is an interesting fact concerning the psychic state of the patient at the time of the operation. If the patient is in grave doubt as to whether or not he can survive the operation; if he lacks confidence in the hospital or in the surgeon, the patient has what in psychology is known as a low threshold, and if he goes under the anesthetic in this state, the effect of any physical injury will be augmented and throughout the entire anesthesia there is manifested the evidence of fear in the respiration and the pulse, and in the way in which he reacts to the anesthetic and the trauma of operation. These patients take the operation poorly. It is as though the patient went under the operation with his motor set at high speed, so that the energy of the body is consumed more rapidly, and hence the exhaustion or shock is increased.—GEO. W. CRILE in *The Southern Medical Journal*.

#### A SUBSTITUTE FOR SUTURES IN CIRCUMCISION.

S. MEREDITH STRONG, M.D.,  
BROOKLYN, N. Y.

Probably there is no surgical procedure upon the human body that gives more generally satisfactory results than does circumcision; and it is my belief, as it is also that of many practitioners, that all boys in whom the prepuce does not remain back of the glands should be circumcised.

It is astonishing that in circumcision so little change has been made in the *modus operandi*. Most operators use too many sutures. Sutures are almost always unnecessary; they add to the length and pain of the operation; make the subject more prone to infection, and often leave ugly stitch scars. I avoid them entirely by the following method:

After the prepuce and the mucous membrane have been cut away in the usual manner (and I like to use the phimosis forceps), the skin and the mucous membrane can be made to adhere together very satisfactorily by applying several hemostats around the cut surface, placing them on the skin from before backward in such a manner as to grasp the mucous membrane and the skin with edges approximating between the jaws of the hemostat for a third of an inch, and compressing the jaws tightly. The fenestrations of the blades press the tissues together in corrugated ridges, and they will remain adherent, when, after a few minutes, the hemostats are removed. No sloughing occurs at the point of compression.

The usual circular dressing is applied, leaving the meatus free. This dressing is changed every 24 to 36 hours. Healing is usually by first intention.

In a very small percentage of cases a bleeding vessel may have to be ligated but this occurrence is very rare and generally compression controls the hemorrhage.

398 FRANKLIN AVE.

#### INDICATION TO OPERATE IN OTITIS MEDIA.

If in the course of a case of acute purulent otitis media (not at the beginning), or in a case of chronic purulent otitis, there is a sudden rise of temperature, say to 102° or more, accompanied by a rigor, with headache and malaise, and if non-aural causes for the temperature can be excluded, and there are no symptoms of meningitis or cerebral abscess, the mastoid should be opened up and the sinus exposed without delay. Children are an exception to the rule.—J. M. CLARKE AND L. FIRTH, in the *Bristol Medico-Chirurgical Journal*.



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**WALTER M. BRICKNER, M.D., Editor**
**NEW YORK, MARCH, 1914.**

## **RADIOENTHUSIASM.**

The public was too recently fooled, too bitterly deceived, by the much-advertised Friedmann "cure" for tuberculosis, to be easily led astray again by the newspaper accounts of an old-new "cure" for cancer. But its interest has been aroused and its imagination has been stirred by the marvelous healing powers of radium as daily recorded in the public press, where "emanation" is now as conspicuous as Carrie Nation once was. If all the quoted accounts and predictions were true, the young doctor who does not invest a few thousand dollars in a tube of the precious stuff will not have supplied himself with all the office furniture his calling demands.

But the blame should not be laid entirely, if at all, at the doors of the newspapers. For the most part, they but report as accurately as they can the reluctantly granted interview, and the conservative outgiving of the medical meeting. Transcending anything in the reliable dailies in reckless enthusiasm and unwarranted prediction are some of the current articles on radiotherapy in our own publications. We have in mind especially at this writing, a recent article (in one of the best medical journals), that bristles with Latin phrases and fulminating fervor. If we rightly interpret the author's sentiment he inclines strongly to the belief that for sufferers with malignant growths the blood-red sun of surgery has forever set and, already in the meridian

of their bright sky, radium is shedding its benignant rays on the constellation and tropic of cancer!

After asserting, with much truth, indeed, that carcinoma of the breast is "one of the opprobria of surgery" the following shocking utterance escapes from him:

Here is a woman looking to her friends as well as ever and able to do her work as a singer. She takes a friend into her confidence and reveals a cancer of the breast; at the urging of this friend she is operated on. The whole complexion of things is changed—no recuperation, even under the most favoring circumstances! But on the contrary, immediate prostration and a steady decline to death four months later. Certainly surgery seems an active "precipitant" in such a case. "But," rejoins Surgery, "we must get the cases early." Said a surgeon dying, himself an earnest advocate of much and early operating, "I am sorry I had it done," referring to an operation in regard to which a foremost surgeon had felicitated him on its very early execution.

Surgery, which is daily saving thousands of lives, including many of those threatened by cancer, does indeed "seem an active 'precipitant'" in various cases in which the outcome is unfortunate. Assuming that the singer's breast cancer was of the most favorable type for surgical treatment; assuming that, instead of "immediate prostration and a steady decline to death four months later" (cause not stated) she had died in four days or four hours; even then, what is there in this example, and what are the accomplishments of radium in mammary carcinoma that justify the dangerous, not to say reckless, teaching conveyed by the paragraph quoted? Our author surveys the literature of recent radium results. He refers to the brilliant cures reported last summer by Bumm and Voigts, to the claims of Domenichi and of Abbe and to the striking observations of Gauss. But none of these, if our recollection serves, includes breast cancers. He dwells on the cures, by various men, of several skin affections, including epithelioma (and without at all discrediting radium it must be said that many of these cures could also be attained by x-rays and caustics). Finally, he says:

Cancer of the breast has not been radiated on a large scale, probably on account of the long established prerogative of surgery in the region. Splendid results, though, have been obtained. Kroenig has in his series a case radiated after laying back a flap of skin—no return at time of writing, nine months after—so a cancer *en cuirasse*, rejected as inoperable, he has cleared up with no return in five months.

And so a case, or is it two cases? of breast cancer, observed for but a few months, is the basis for to-

day setting up radium against a carefully elaborated, long studied operation with an *established record* (from repeatedly combined statistics) of at least 25% of cures and a much larger percentage of cases in which life has been prolonged from three to ten years or more!

Kroenig himself, in both his private and his published utterances, is far more conservative in his deductions than is the enthusiastic author who quotes him. "All Europe is aflame. A veritable *radium-fieber* rages," proclaims that author; but, according to some recent reports, the European conflagration whose flying embers have kindled his imagination, is not now burning so furiously, and in some places the fire department of critical observation has reduced it to a mere smolder.

The enthusiasm over radium therapy, disseminated largely by those whose personal observations have been very limited, is nothing new in the history of medicine. It is but a repetition of experiences following the introduction of Koch's tuberculin, of Wright's vaccines, of Bier's hyperemia, of Ehrlich's salvarsan and of numerous other therapeutic discoveries. These have all found their places, not as large as they had been expected to occupy, but still very conspicuous. And so with radium; when the European conflagration has subsided, when the "radium-fieber" has ceased to "rage," this powerful agent will be given its proper sphere. That sphere may be larger even than the present-day enthusiasts acclaim for it, but the present day is for observations, not for predictions.

Surgery is admittedly unsatisfactory in the treatment of malignant growths. We seek a specific. Radium emanations and  $\alpha$ -rays possess a selective action on young cells, such as those of cancers, which, under favorable conditions, they have the power to destroy, stimulating their replacement by connective tissue. This, which approaches a specific action, was known before. It is the discovery of the respective activities of, and reactions to, the various radium rays, and the means of screening out the harmful ones, that has given the fresh impetus to radium treatment, and has secured so many truly striking results as are reported from the intensive exposures of, especially, uterine cancers. In analysis, however, it appears that the chief accomplishment of radium has been in superficial growths. To effect satisfactory results the radium must be brought in close, nay intimate, contact. The rays of selective activity are able to penetrate but a very slight distance. Competent observers there are, therefore, who advise the  $\alpha$ -rays when the growth is deep or massive. It is especially in cancers of the

female genital tract, of the pharynx, of the larynx, where radium is more easily applied than  $\alpha$ -rays, that they prefer it.

This somewhat lengthy discourse is not written to disparage the employment of radium, whose therapeutic value has been increasing with our developing knowledge of its properties; nor to repress scientific fervor. Science is advanced chiefly by enthusiasm—in seeking truths; it is hurt most by enthusiasm—in proclaiming half-truths!—W. M. B.

## THE GONOCOCCUS COMPLEMENT-FIXATION TEST.

The complement-fixation test for gonorrheal infection, originated by Müller and Oppenheim and developed by Schwartz and McNeil, has been, by corroborative studies, now definitely established in diagnostic importance as based upon a reaction at least as specific as the parallel syphilis phenomenon of Wassermann.

The importance of such a test is at once obvious in determining the cure of gonorrheal urethral and para-urethral infections, in the differential diagnosis of arthritides and female pelvic inflammations, and in determining the occasional gonococcal origin of systemic infection marked by lesions in the heart, kidney, bone or muscle.

The most extensive study of this test that we have noted in recent literature is that of Thomas and Ivy, of Philadelphia (*The Archives of Internal Medicine*, January 15, 1914). To indicate the specificity of the reaction, and the conditions in which that reaction may be expected to be negative, we quote from their conclusions:

"1. A positive reaction is invariably reliable and always denotes the presence of a focus of gonococcal infection.

2. A negative reaction frequently fails to determine the presence of disease especially in the acute and subacute stage when the disease is limited to the urethra, and never [always fails] when it is confined to the anterior urethra or vagina alone.

3. In no alien non-gonorrheal infections of [or] systemic disease has a positive reaction been obtained; the test, therefore, appears to be absolutely specific.

4. A positive reaction has been found to be present in 21.05 per cent. of patients clinically cured. Such patients, therefore, should not be discharged from treatment or observation until a negative reaction has been obtained.

5. Not infrequently, either when suspicious lesions are presented or accidentally, positive reactions will be discovered in patients denying gonorrhea.

6. In only 9.09 per cent. of cases of acute and subacute antero-posterior urethritis has the comple-

ment-fixation test resulted positively. The earliest appearance of a positive reaction in a primary attack of posterior urethritis, without complication, occurred in the sixth week.

7. In a number of cases of chronic recurrent urethritis with acute exacerbations, the test was invariably positive; many of these patients undoubtedly had prostatitis.

8. The reaction resulted positively in one-third of all cases of chronic posterior urethritis; undoubtedly many of these cases had a mild or low-grade prostatitis.

9. In 52.08 per cent. of cases of chronic prostatitis a positive reaction was obtainable.

10. Two-thirds of all stricture cases demonstrated a positive test.

11. In epididymitis a positive complement-fixation test was observed in 87.5 per cent. of cases. If, from our series, one case probably tuberculous, may be eliminated, and a time duration of five weeks can be imposed, the positive result in this form of disease has been 100 per cent.

12. In arthritis, undoubtedly gonorrheal in character, positive reactions were obtained in 100 per cent. of cases.

13. In the diagnosis and differential diagnosis of pelvic disease in women, the gonococcus-fixation test is destined, unquestionably, to play an important rôle. We have been unable to obtain any positive results in uncomplicated urethritis, vulvovaginitis and Bartholinitis, and it would appear that the infection must ascend at least to the level of the uterus in order to produce a positive blood response.

14. Inoculation of gonococcus bacterin, anti-gonococcic serum, etc., may in themselves by the production of immune bodies be causes of positive reactions. How long these immunizing effects may endure is unknown, but we have observed patients, treated by immunotherapy, who one year later demonstrated negative complement-fixation reactions.

15. Although the bacteriological demonstration of the gonococcus culturally is the only absolute method for its identification in chronic inflammatory processes, the method as a routine procedure is impractical and susceptible of many failures and fallacious results, so that the complement-fixation test is not only less laborious, but is productive of a higher percentage of positive findings. . . . "

—W. M. B.

#### ROSWELL PARK.

The sudden death on February 15th of Roswell Park, professor of surgery at the University of Buffalo, removes a conspicuous figure from among America's prominent surgeons. Of distinguished American ancestry on both sides, he was born in New England in 1852. Throughout his entire medical career he has been identified with teaching, first of anatomy in the Woman's Medical College of Chicago, and the Chicago Medical College, then of surgery in Rush Medical College and the North-

western University. He held the chair of surgery in the University of Buffalo for over twenty years, and was, perhaps, the most conspicuous figure in the medical school of that institution.

Dr. Park was an ardent supporter of the theory of a parasitic origin of cancer, in which view he was no doubt largely influenced by Gaylord and other workers in the N. Y. State Cancer Laboratory at Buffalo, of which Park was a director. In addition to various monographic and other contributions to surgical literature, and to his labors as a medical editor, he has left two meritorious books—his "Modern Surgery," a large text-book, and an interesting but somewhat epitomized "History of Medicine."

### Surgical Suggestions

In differentiating syphilitic from other bone lesions a negative Wassermann reaction is not diagnostic.

The error is often made by capable Roentgenologists of mistaking the normal bone grooves of meningeal arteries for lines of skull fracture. Familiarity with the location of these grooves and comparative radiographs of the opposite side will obviate such an error.

It is worth remembering that in Hodgkin's disease the glandular enlargements may be confined for a long time (even a year or more) to one side of the neck. In clinically differentiating this chronic, localized adenopathy from that of tuberculosis, absence of softening and of fusion of the glands, daily marked elevations of temperature, increasing anemia, and enlargement of the spleen, some or all of which signs and symptoms are usually present, are fairly diagnostic. A negative von Pirquet reaction, and a thick, doughy, pasty-appearing skin may also help the diagnosis.

An acutely appearing almond-sized or larger swelling in the skin of the submental region, which the patient usually thinks is an inflamed gland, is not an uncommon winter occurrence, especially in women, from exposure to the cold. No treatment is necessary other than protection of the part from further chilling. The prominences of the cheeks may also be thus affected, but less frequently. Sudden swelling and redness of the nose, frightening the patient into a diagnosis of erysipelas, is a less common "frost-bite" experience.

## Surgical Sociology

Ira S. Wile, M. D., Department Editor.

### THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION HOSPITAL.

In connection with the Panama-Pacific International Exposition, attention is being called to the establishment of an emergency hospital whose model equipment is to be supplied entirely by exhibitors. Dr. R. N. Woodward, at present in charge of the United States Marine Hospital, situated near the Golden Gate, has been appointed to assume control of this hospital. From the standpoint of exhibition, no pains will be spared to make the equipment as model as is possible, from the installation of auto ambulances to the minor appliances necessary for the simplest operative procedures.

The purpose of the hospital is indicated by its name: an emergency hospital. If, however, the temporary patient's health were to be endangered by removal to his home or to another hospital, he will be permitted to remain and receive the necessary medical and nursing attention until able to stand transportation to other sheltering walls.

In connection with this model emergency hospital, there would be a distinct advantage in having model out-patient departments, with social service equipment and indeed model units of the kitchen, laundry and other essential departments of a model hospital.

The triumphs of American medicine in the Panama Zone serve as an excellent reason for placing stress upon medical, surgical and sanitary equipment at this Exposition. The canal was built through the co-operation of the medical and sanitary engineers without whose skill, resourcefulness and perseverance, the work of the technical engineers would have been valueless.

### WHAT CONSTITUTES A NURSE.

In view of the relation of nursing to the development of hospitals; and the importance of adequate training in relation to the home care of surgical cases, the wide agitation for settling the status of the certified nurse, the registered nurse, the practical nurse, the half-trained nurse, the correspondence school nurse, the volunteer nurse, and the various other types that may come to mind, is of immense importance. The American Hospital Association at its Boston Convention appointed a committee to consider the grade and classification of nurses. With a desire to secure an expression of opinion from all parts of the country, the committee would like to have answers to the following questions sent to Dr. Renwick R. Ross, Buffalo General Hospital, Buffalo, N. Y.

1. In your opinion is it possible to meet the nursing needs of the average community in city, town and country, in the United States and Canada with graduate nurse service alone?

2. If in your opinion only graduate service should be used, will you kindly present an outline of a

practical comprehensive programme, for supplying graduate service to all classes needing continuous nursing?

3. If more than one grade of nurse is a necessity, will you please state how many grades you consider necessary? How would you classify nurses so as to include in your classification all who nurse for hire?

4. Will you kindly suggest a substitute term for the grade B or "certified nurse" as recommended by the committee on grading of last year, if you consider that some better term should be used to designate nurses trained in special hospitals or hospitals unable to give a full training? Please state whether or not you are satisfied with the distinctive terms recommended by the committee of last year. Give briefly your reasons if not satisfied.

5. If several grades seem to be necessary, how and where should the several grades be trained?

6. In view of the fact that many tuberculosis hospitals find it impossible to secure sufficient graduate nurses to care for their patients, what measures would you suggest for meeting the nursing needs in such institutions?

7. If training is given in a tuberculosis hospital, how long should the course be and how would you classify those completing such a course?

8. In view of the fact that there is a constant and pressing demand for maternity nurses in homes of moderate means, what measures that are practical for the average community would you suggest for meeting this need?

9. What constructive recommendations would you make with a view to improving on the plans presented by the committee on the grading of nurses in the report submitted to the Association at the Boston convention, a copy of which was mailed to each member?

10. Will you kindly suggest to the committee of this year any feasible plans which occur to you for improving the quality of home nursing now being received by those who cannot afford graduate nurses?

### TONSILS AND TONSILLOTOMY.

A study of the results of tonsil operations on public school children in New York City serves to cast suspicion upon the value of some of the operations for hypertrophied tonsils and adenoids as performed in clinics. According to the investigation of Dr. Cocks, of 89 cases operated on, approximately 10 per cent. received mutilations of the soft parts adjoining the tonsils; of 21 cases operated upon without general anesthesia 19 were badly done; and of 52 cases wherein general anesthesia was administered, 12 were poorly done.

Obviously, children suffering from nasal and pharyngeal defects should be sent, in so far as possible, to institutions maintaining special departments for treating these conditions. Whether all tonsil and adenoid operations of children should be done under anesthesia is a question which requires careful investigation, but it is certain that if the operations are performed under general anesthesia the institutions in which they are performed should be

prepared to retain the patients in the ward for at least eighteen to twenty-four hours after the operation.

Children with enlarged tonsils and adenoids are sent to institutions to undergo an operation which will leave the throat and nose in a normal condition. Unless this end is accomplished, the work cannot be regarded as properly done. Some follow-up system which would indicate the end-result of operations upon the tonsils and adenoids probably would reveal the fact that many of the operations have failed to accomplish the purpose for which they were devised. Too frequently outside of pain and suffering for the children and the consciousness on the part of parents that they have attempted their duty to their children, little worth mentioning is accomplished. Unnecessary operations are to be deprecated. Improperly performed operations are to be condemned.

The responsibility for good surgical treatment rests upon the institutions whose staffs are directly responsible. It is indeed time that surgical procedures, formerly deemed of minor importance, should be given more serious thought in order that the public may not come to the conclusion that a large proportion of operators are mere bunglers. Humanitarian interests demand that the safety, welfare, comfort, and health of the child should be given as much consideration in the performance of a tonsillectomy as in the amputation of any other portion of the body. There are inherent dangers in all operative procedures, but aside from these, there need be no unnecessary hazards of shock, hemorrhage, mutilation, or recurrence. Surgical procedure and surgical technic of the highest order are mandatory in order to relieve the profession from the criticisms now being leveled against the operations for tonsils and adenoids, as indiscriminately performed by incapable, indifferent, or negligent operators.

## Book Reviews

### **Surgery of the Upper Abdomen.** In two volumes.

By JOHN B. DEEVER, Sc.D. LL.D., Professor of the Practice of Surgery in the University of Pennsylvania; Surgeon-in-Chief to the German Hospital, and Surgeon to the University Hospital, Philadelphia; and ASTLEY PASTON COOPER ASHURST, A.B., M.D., Instructor in Surgery in the University of Pennsylvania, and Associate Surgeon to the Episcopal Hospital, Philadelphia. *Volume II. Surgery of the Gall-Bladder, Liver, Pancreas and Spleen.* Octavo; 499 pages; 52 illustrations. Philadelphia: P. BLAKISTON'S SON & Co., 1914. Price \$5.00, net.

Almost five years have elapsed since we reviewed at some length (AMERICAN JOURNAL OF SURGERY, May, 1909) the first volume of this work, devoted to the surgery of the stomach and duodenum. We have awaited the appearance of the second volume with very great interest. A survey of the immense amount of literature, the digestion of which its preparation has entailed, affords some explanation of the time that preparation has consumed; and the delay in its appearance makes it all the more welcome, because it is correspondingly more complete and up-to-date.

In the review of the first volume we sufficiently indicated the character of the work—its thoroughness and breadth of critique. This volume is written in the same manner. It represents a very painstaking study of all the literature, balanced in its presentation by the author's experiences, especially that of Deaver. At the end of each chapter the bibliography is appended. About 650 authors are referred to in the double-column six-page index of names. This is the amount of literature actually included; a great deal more, of course, must have been examined.

Two chapters (150 pages) are devoted to the surgery of the gall bladder and biliary ducts; one (50 pages) to non-bacterial, non-neoplastic affections of the liver; one (20 pages) to tumors of the liver, gall bladder and ducts, and one (about 18 pages) to injuries of the liver and biliary passages. The surgery of the pancreas occupies two chapters of about 130 pages, and that of the spleen one chapter of 60 pages. All the operations are grouped in the final chapter of 45 pages.

The pathology appears to us to be very sound; and the operations recommended are those we believe now practiced by the most expert abdominal surgeons. We are pleased to note, for example, that the authors recommend, in cholecystectomy, dislocation of the liver through the wound; removal of the gall bladder from within outward, after ligating the cystic vessels and dividing the cysticus; splitting and stripping the serosa over the gall bladder and suturing these peritoneal flaps over the raw liver surface. This, it seems to us also, is the cleanest type of cholecystectomy, the safest in technic, and the most surgical in "toilet." To be sure, it is not by any means always applicable, and especially not in cases of gangrenous, distended gall bladders in obese subjects; but it is the ideal method, and is to be recommended in all cases where it can be expediently employed.

**The Modern Hospital.** Its Inspiration; its Architecture; its Equipment; its Operation. By JOHN ALLAN HORNSBY, M.D., Secretary, Hospital Section, American Medical Association, etc., and RICHARD E. SCHMIDT, Architect, Fellow, American Institute of Architects. Large octavo; 644 pages; 207 illustrations. Philadelphia and London: W. B. SAUNDERS Co., 1913.

Recent years have marked a steadily increasing interest in the problems of hospital construction and administration that is rapidly approaching, if it has not already attained, the form of an "intensive study," and which is participated in not only by architects, lay and other trustees, and salaried superintendents, but also by a goodly proportion of the medical profession and the public. The haphazardly built hospital, conducted independently of methods and purposes now standardizing, is suffering close scrutiny, and faces the prospect of early modification or extinction.

As representative in America of this increasing interest in hospital construction and administration, may be cited the activities of the American Hospital Association, the formation of the Hospital Section of the American Medical Association, the establishment last year of a splendid journal, *The Modern Hospital* (under Dr. Hornsby's editorship), and the development of the literature of the subject, from occasional fragmentary works to dignified treatises. The latest and most comprehensive and, we believe, the most authoritative, of these is the excellent work before us, written by Dr. John A. Hornsby, for several years superintendent of Michael Reese Hospital in Chicago, with the collaboration of Mr. Richard E. Schmidt, architect.

The sub-title of the treatise fairly indicates its scope. Indeed, it covers the special features and general principles of hospital construction, and the multitudinous details of equipment; financial management; general and department administrations; subdivision of medical work; ward, operating room and laboratory activities; supplies; social service; out-patient work, etc., etc.

Each of these main divisions might well occupy a separate volume; yet they are handled in a thorough fashion and with few details unconsidered. To be sure, much of the work is based on personal experiences and personal preferences. The conduct of large hospitals has not yet

passed beyond the stage when such a book as this might be expected largely to reflect the activities and views of its author, in this case, one of the most progressive and experienced of hospital administrators.

It would take too much space to recite even the list of subjects considered in this treatise. Covering, as they do, every aspect of hospital maintenance and administration, the book is invaluable, in its sphere, for reference and comparison. The numerous illustrations of plans, hospital furniture, utensils, printed forms, etc., are all very useful and, like the typography, they make the appearance of the volume in keeping with its worth.

**Surgical Diseases of Children.** A Modern Treatise on Pediatric Surgery. By SAMUEL W. KELLEY, M.D., LL.D., Honorary Professor of Surgical Diseases of Children, Medical Department, National University, St. Louis; Pediatric and Orthopedist, St. Luke's Hospital, Cleveland, etc. *Second edition.* Large octavo; 789 pages; 295 illustrations. New York: E. B. TREAT & Co., 1914. Price \$5.00.

We regarded the appearance, five years ago, of the first edition of this unique treatise of such moment in American medical literature that we made it the subject of an editorial (August, 1909). Therein we reviewed the books on pediatric surgery that had previously appeared, commenting on the fragmentary character of most of them, and discussed the broader aspects of pediatric surgery as a department of special surgical knowledge.

Prof. Kelley's treatise was without any serious rival. Only Karewski's "Chirurgische Krankheiten des Kindesalters" and the masterful works of Kirmisson, "Précis de Chirurgie Infantile" and "Traité des Maladies Chirurgicales d'Origine Congénitale," if considered together, approached it in dignity, and neither of these is as complete or as modern. Within the past three years, however, two other large works have appeared in America, and one each in France and Germany (as parts of a multi-volume series on children's diseases).

Kelley's work is more than a text-book on the diagnosis and treatment of the surgical conditions that are peculiar to childhood. It is a treatise on all surgical diseases and deformities as they occur in children, in which the physiology and pathology of childhood are woven into its surgical therapeutics.

This work has not been greatly enlarged in preparing this edition (about 25 pages), but several additions have been made to it, and various portions have been revised.

In these days of fine books, so excellent a treatise as this is deserving of better press-work.

**A Treatise on the Diseases of Women for Students and Practitioners.** By PALMER FINDLEY, B.S., M.D., Professor of Gynecology, College of Medicine, State University of Nebraska, etc. Octavo; 954 pages; 632 engravings in the text and 38 plates in color and monochrome. Philadelphia and New York: LEA AND FEBIGER, 1913. Price \$6.00, net.

Findley's "Diagnosis of Diseases of Women," considerably revised, has furnished the basis for the preparation of this comprehensive and practical text-book. After perusing it we feel justified in commending it as just the sort of an "all-around" work on gynecology as the general practitioner and the student, and also the practicing surgeon, may purchase with satisfaction. The diagnostic and operative aspects of gynecology are fully presented, and, in addition, Findley devotes a great deal of space to subjects that many text-books pass over with insufficient consideration. We refer to conservative, *i. e.*, non-operative, gynecological therapeutics, and to such topics as dress, hygiene and diet. Baths, douches, exercise, posture, are thus discussed at length. General methods of examination are dealt with, as well as local examinations. The preparations for an operation—the surgeon, the patient, the room, the utensils—are details, as well as post-operative care. Another valuable feature of the book is the discussion of those obstetric complications as require "surgical" consideration, *e. g.*, primary repair of the lacerated peri-

neum and cervix, prolapse of the pregnant uterus, fibroids and ovarian cysts in pregnancy, the surgery of puerperal infection.

The book is richly illustrated with pictures in black and in colors. The text is readable, interesting and up-to-date. We do not believe that a work as large as this would have lost any of its attractiveness as a practical working text-book if it had generously included bibliographic references and an author's index. These detract nothing from its value to the reader who does not care for these references; they enhance it a great deal for the reader who does.

**On Diseases of the Rectum and Anus.** Including the Sixth Edition of the Jacksonian Prize Essay on Cancer. By HARRISON CRIPPS, F.R.C.S., Consulting Surgeon, St. Bartholomew's Hospital; Member of the Council, Royal College of Surgeons, etc. *Fourth edition.* Octavo; 588 pages; illustrated. New York: The MACMILLAN Co., 1914. Price \$3.25.

In 1907 we reviewed a revised (third) edition of Cripp's well-known work which, like its part, Cancer of the Rectum, is an essay rather than a treatise or text-book. This fourth edition is a reprint of the third, and the included "sixth" edition of the Jacksonian Prize Essay of 1876 is identical with the "fifth." The title-page states that this "fourth edition" is "reprinted to include the opening address on the Surgical Treatment of Rectal Cancer, delivered at the annual meeting of the British Medical Association, Liverpool, 1912"; but we fail to find the address in the text, or any other reference to it in foot-note, table of contents or index.

**The Intervertebral Foramen.** An Atlas and Histologic Description of an Intervertebral Foramen and Its Adjacent Parts. By HAROLD SWANBERG, Member, American Association for the Advancement of Science. Duodecimo; 101 pages; 16 original plates. Chicago: CHICAGO SCIENTIFIC PUBLISHING Co. (Grace and Osgood Streets), 1914.

This little monograph was undertaken to study the relation of the intervertebral foramen to its emergent spinal nerve, in order, it would appear, to determine what anatomical basis there may be for such "schools" of treatment as are based on the dogma that many diseases arise from impingement upon these nerves by assumed spinal column deviations.

The study consisted in serial sections through the bone comprising, and the nerve contained in, the first right dorsal intervertebral foramen of an adult cat. Several of these sections are reproduced.

Mr. Swanberg concludes from them that the foramen is throughout much larger than the nerve, which is also protected by an ample envelope of fat; that even if the intervertebral disc disappeared entirely the foramen would not be sufficiently reduced in size to pinch the nerve; and that thinning of the articular cartilages would increase the size of the foramen. Even in ankylosed specimens, where the foramina were greatly decreased in size, there seemed enough room for the nerve to pass, free from any bony pressure.

**Progressive Medicine.** Edited by H. A. HARE, Professor of Therapeutics and Materia Medica in the Jefferson Medical College, Philadelphia, assisted by L. F. APPLEMAN, Instructor in Therapeutics, Jefferson Medical College, Philadelphia. December 1, 1913. Philadelphia: LEA AND FEBIGER.

This volume includes the following digests of the progress in their respective branches during the past year: Diseases of the Digestive Tract and Allied Organs, the Liver, Pancreas and Peritoneum, by Edward H. Goodman; Diseases of the Kidneys, by John Rose Bradford; Genito-Urinary Diseases, by Charles W. Bonney; Surgery of the Extremities, Shock, Anesthesia, Infections, Fractures and Dislocations and Tumors, by Joseph C. Bloodgood; Practical Therapeutic Referendum, by H. R. M. Landis. In each instance, the review leaves little to be desired in the way of comprehensiveness and critique.



**Surgical Experiences in South Africa 1899-1900.** Being Mainly a Clinical Study of the Nature and Effects of Injuries Produced by Bullets of Small Calibre. By GEORGE HENRY MAKINS, C.B., F.R.C.S., Senior Surgeon to St. Thomas' Hospital, London; one of the Consulting Surgeons to the South African Field Force, etc. *Second edition.* Small octavo; 504 pages; 105 illustrations. London: OXFORD UNIVERSITY PRESS, 1913. Price \$3.75.

Although the South African war passed into history before the beginning of this century, this much quoted book has lost none of its interest, for it deals casuistically with gunshot injuries of the same character as have been encountered in still more recent wars conducted with modern firearms.

This edition is practically a reprint of that of 1901 except for the continuation of a few of the case histories.

**Manual of Surgery.** By ALEXIS THOMSON, Professor of Surgery, University of Edinburgh; Surgeon, Edinburgh Royal Infirmary; and ALEXANDER MILES, Surgeon, Edinburgh Royal Infirmary. *Volume III. Operative Surgery. Second edition.* Octavo; 620 pages; 255 illustrations. Edinburgh, Glasgow and London: HENRY FROWDE and STODDER & STOUGHTON, 1913. Price \$3.50.

Very little can be added to the favorable criticism of the first edition of this manual of surgery, made some time ago. One is again impressed by the clarity and terseness of the text, the up-to-date character of the descriptions of operations, and the general excellence of the illustrations. Concerning the latter, however, it should be stated that the illustrations accompanying the sections devoted to the ligation of arteries are very hazy and too diagrammatic. It is also strange to see the cerebral decompressive craniotomy depicted on the left side of the skull. The authors have adopted, wisely, it is believed, the Basle anatomical nomenclature in this edition, but place the old terms in parentheses wherever the newer ones are employed.

**Chirurgische Operationslehre.** Herausgegeben von AUGUST BIER, Berlin; HEINRICH BRAUN, Zwickau; HERMAN KUEMMELL, Hamburg. *Vol. III. Operationen am Mastdarm, an den Harn- und Maennlichen Geschlechtsorganen, und an den Extremitaeten.* 986 pages; 797 illustrations, mostly colored. Leipsig: JOHANN AMBROSIOUS BARTH, 1913. Price \$12.00.

The first part of this monumental work on operative surgery has been reviewed in the AMERICAN JOURNAL OF SURGERY. It was then pointed out that the three authors have collaborated with and have valuable contributions from many prominent German surgeons. Only two of the sections of this volume (operations on the kidney, renal pelvis and ureters; operations on the prostate) have been written by one of the three authors (Kuemmell). Each of the volumes is an entity, with its own bibliography, index, table of contents, etc. This one, of nearly a thousand pages, is of the same high standard of excellence as the preceding one reviewed in these columns. Examining it cursorily, one gains the impression that it is a colored atlas of surgical procedures, so replete is it in magnificent drawings, photographs, and colored plates at every turn of the pages. A study of the text, however, shows that this does not occupy a place of second importance. Each operative procedure has been subjected to a careful analytical criticism, and that operation is fully described which is deemed the best by the authors. The choice is generally a very happy one, we believe, but the insignificant place often given to the work of surgeons other than Germans cannot be overlooked. Nor is there a uniformity of thoroughness in the treatment of the various sections of the book. The most adverse criticism must be made of that dealing with operations upon the rectum, in which the text is too brief and too dogmatic, the illustrations not well chosen, and the bibliography too fragmentary.

It can safely be prophesied, however, that this work on operative surgery will prove one of the standards on the subject because it is, in general, so thorough, so clearly presented, and so aptly illustrated.

**Principles of Surgery.** By W. A. BRYAN, A.M., M.D., Professor of Surgery and Clinical Surgery at Vanderbilt University, Nashville, Tenn. Octavo; 677 pages; 224 original illustrations. Philadelphia and London: W. B. SAUNDERS COMPANY, 1913. Price \$4.00, net.

This book may be described as a combination of surgical pathology, bacteriology and diagnosis. Although no one of the three is exhaustively presented, their fusion in one work, clearly and logically presented, makes an attractive book for the student. Upon an examination of the composition of the book it is at once evident that the fragmentary remarks upon treatment scattered here and there through the volume are entirely out of place and detract from its merit. Otherwise Bryan's "Principles" impresses the reviewer as a very desirable and a very careful analysis of our present knowledge of the subject. The work is not meant for the advanced student; yet a full bibliography would enhance its value. The illustrations and typography are excellent.

**Operative Surgery for Students and Practitioners.** By JOHN J. MCGRATH, M.D., Clinical Professor of Surgery, Fordham University; Professor of Operative Surgery, New York Post-Graduate Medical School; etc., etc. *Fourth revised and enlarged edition.* Octavo; 838 pages; 364 illustrations. Philadelphia: F. A. DAVIS COMPANY, 1913. \$6.00, net.

In this edition the author has endeavored to bring the work up-to-date, especially in regard to surgical technic. The reader will find all the operations of any importance described with considerable completeness, but it is to be regretted that McGrath has omitted critical studies of the relative values of the various groups of operations. Such analyses, by guiding the reader through the pages, would greatly enhance the value of this excellent book.

**Genito-Urinary Diseases and Syphilis.** By EDGAR G. BALLENGER, M.D., Adjunct Clinical Professor of Genito-Urinary Diseases, Atlanta Medical College; Editor, *Journal-Record of Medicine*, etc., etc. Assisted by OMAR F. ELDER, M.D. *The Wassermann Reaction.* By J. EDGAR PAULLIN, M.D. *Second edition, revised.* Octavo; 529 pages; 109 illustrations. Atlanta: E. W. ALLEN & Co., 1913. Price \$5.00, net.

The first edition of this work has required very extensive revision in order to carry it up-to-date. It is evident that the authors have been carefully studying the recent literature of their subject. The result is that such topics as vaccine therapy, the tests for functional activity of the kidneys, pyelography, etc., etc., will be found fully discussed. The book is one that should be very useful to those who do not wish to study the exhaustive works on genito-urinary diseases and are not satisfied with the elementary ones. It is very practical and contains much useful information and many valuable suggestions.

**The Elements of Bandaging and the Treatment of Fractures and Dislocations.** By WILLIAM RANKIN, M.A., M.B., Ch.B., Dispensary Surgeon, Western Infirmary, Glasgow. Small octavo; 116 pages; 68 original illustrations. London: HENRY FROWDE and HOEDER & STOUGHTON, 1913. Price \$1.50.

This small book is meant for those who have had very limited experience. The subject of bandaging is treated briefly and most of the remainder of the book is devoted to the diagnosis and the treatment of fractures. Many valuable practical points are succinctly presented, but the reviewer must take issue with a number of statements rather dogmatically made. For example, it is a bold assertion to make concerning fractures of the elbow that if "it is possible to fully flex the arm up to an acute angle, then in every such case a good result as regards appearance and function will be attained if the arm is fixed up by means of plaster-of-paris bandages \* \* \* for four or five weeks." Rankin's book should nevertheless prove of value to those for whom he has written it.

## Progress in Surgery

A Résumé of Recent Literature.

**Extrathoracic and Intrathoracic Esophagoplasty in Connection With Resection of the Thoracic Portion of the Esophagus for Carcinoma.** WILLY MEYER, New York. *Journal American Medical Association*, January 10, 1914.

Meyer describes the Jianu operation which he says has in a way revolutionized the surgery of the lower esophagus. After a brief review of operations formerly devised, he describes Jianu's technic, which utilizes the major curvature of the stomach for the creation of a rather long tube, one end of which remains in connection with the gastric fundus while the other free end can be drawn up. He has carried out the operation in three patients, all of whom made good recoveries. A new tube of ample size with good blood-supply and surrounded completely by peritoneum is formed, through which the patient will be able to pass his food. If transported outside under the skin of the thorax, the first stage of extrathoracic esophagoplasty has been accomplished. If pulled up into the pleural cavity through a hole in the diaphragm, as proposed by Meyer, it can be used to replace the lower portion of the esophagus after resection for carcinoma; intrathoracic esophagoplasty. The paper gives full details as to both operations. He concludes, however, that intrathoracic esophagoplasty, when properly worked out, would seem to be an ideal operation. If further observations in man, however, should prove that the transposed oral stump of the esophagus, no matter how long, has no tendency to become necrosed in its distal portion, but will live as a rule, further experimental work for the perfection of intrathoracic esophagoplasty will be less urgent and extrathoracic esophagoplasty will become the operation of choice for resection of carcinoma in any part of the esophagus.

**Hair-Balls of the Stomach and Intestine.** L. HEAZLIT, Auburn, N. Y. *Journal American Medical Association*, January 10, 1914.

A rather unusual case of hair-balls in the stomach and intestines in a girl of 13 is reported by Heazlit. The child had always been in good health except for the usual diseases of childhood and pneumonia at 11 years of age. From her fifth to her tenth year she was observed to have the habit of swallowing hair, but after that it was supposed that she had discontinued it. Occasional attacks of stomach disturbance, not specially severe, had appeared for about a year prior to her present illness which began July 19, with abdominal pain, vomiting, etc. Her father, a physician, then discovered the presence of a large sausage-shaped tumor occupying the stomach region which was movable and tender. A tuft of hair vomited recalled the former habit of the child. An operation was performed and the tumor weighing 15 ounces and completely filling the cavity of the stomach was removed. Symptoms of obstruction still continuing, a second operation was performed and a mass of hair measuring 3 inches in length and completely filling the lumen of the bowel was extracted from the ileum. Convalescence was uneventful and the patient has been well since. The author reviews the subject of hair-balls in man and finds over seventy cases in the literature. Some of these were discovered only at necropsy, but he has collected reports of forty-one cases operated on, thirty-five gastrotomies, four enterotomies and two in which both operations were required. The habit of hair-swallowing seems to be confined to the female sex, and in most cases it has been observed in persons otherwise normal. There are cases on record in which the hair mass weighed 4 pounds or more. Their usual location was in the stomach, though prolongation into the duodenum was reported in seven cases. The only constant symptom is the presence of a hard tumor in the upper abdomen not to be otherwise explained. The gastric symptoms vary from mild digestive disturbance to re-

peated colicky attacks and vomiting and may last for years. The stomach seems exceedingly tolerant. The use of the Roentgen ray in diagnosis is comparatively recent. One case in which it was used to advantage was that of Holland of Liverpool reported in July of last year. In another case mention of a roentgenogram is made, but it did not lead to a successful diagnosis. The operative treatment of hair-ball has been notably successful. There have been no deaths in thirty-five gastrotomies and the only deaths reported were of children nearly moribund from intestinal obstruction.

**Congenital Pyloric Stenosis: A Study of 22 Cases With Operation by the Author.** H. M. RICHTER, Chicago. *Journal American Medical Association*, January 31, 1914.

Nineteen of the twenty-one were of the hypertrophic type and two of the type known as spasmodic. In all of the nineteen definite, firm, olive-shaped tumors were demonstrated at operation. In eighteen they were palpable externally and in the other the clinical diagnosis was clear. The stomach was always found markedly distended and the duodenum collapsed. The histology agrees with that observed by others, a simple hyperplasia of the circular muscular fibers. In none of the eighteen cases was there any other congenital malformation, except a short mesocolon in one, and in all cases the clinical picture was classical, and the essential features of the disease uniform. The onset has always been shortly after birth, usually the second or third week, and abrupt enough to be definitely noted. The existence of the typical condition does not predicate an absolute closure of the pylorus, increasing tension may force some food through and a relatively large sound could be passed. It is particularly important, Richter says, that the Roentgen ray as a diagnostic measure be limited to determining the rate of emptying the stomach, not the patency of the pylorus. To exclude the diagnosis of hypertrophic stenosis on the basis of the passage of bismuth may lead to serious error. Recoveries that have been reported by competent observers indicate that a sufficient passage may be left to sustain life, and cases have been reported through a new opening into the jejunum. There is nothing in the nature of hypertrophic stenosis that essentially predicates a permanent closure and there is no good reason why these tumors may not ultimately disappear in some cases. German statistics give the mortality of unoperated stenosis as close to 20 per cent. Richter's mortality in his cases was three in the twenty-one, one occurring after recovery from the operation, a total of 13.3 per cent. A tabulated summary accompanies the article.

**An Inflating Gastroscope and Duodenoscope.** R. C. KEMP and A. VANDER VEER, JR., New York. *New York Medical Journal*, February 7, 1914.

The determination of an intragastric lesion, *e. g.*, an ulcer, by mere external inspection or palpation of the stomach in the course of an exploratory laparotomy, is often misleading. Ulcers especially are liable to be overlooked. To ensure greater diagnostic precision, the authors have devised an ingenious gastroscope and duodenoscope based largely on the principle of the cystoscope, which can be introduced into the gastrotomy wound. With this instrument every part of the stomach and the upper duodenum may be inspected. Furthermore, inasmuch as ulcers are often hidden behind folds of the mucosa, an arrangement is attached whereby the stomach can be dilated during inspection. For a description of the instrument and the necessary technic, the reader is referred to the original paper. The author's observations and experiments have thus far been limited to animal experiments.

**Experimental Production of Gastric Ulcers by Intravenous Injection of Clumped Colon Bacilli.** EDGAR C. STEINHARTER, Cincinnati. *The Lancet-Clinic*, January 24, 1914.

Following the line of experimentation suggested by Letuelle and later by Rosenow, who showed that the injection of certain strains of pneumococci and streptococci was

followed by the appearance of gastric ulcers, Steinharter attempted to produce the lesion by using colon bacilli. It has long been known that an emulsion of colon bacillus in the presence of free hydrogen ions can be agglutinated in from one to four hours when incubated at body temperature. Gastric juice also possesses this power. Steinharter used 1/12 normal Hcl to clump the colon bacilli and then injected the washed centrifugal sediment into the blood stream of rabbits. The animals showed hemorrhagic erosions at the pyloric end of the stomach, the other organs being normal. These lesions appeared within twenty-four hours after injection in some of the protocols presented by the author. He believes that the hyperacidity and constipation together with the presence of *B. coli* may have a good deal to do with the etiology of human gastric ulcers.

**Jackson's Pericolic Membrane. Its Nature, Significance, and Relation to Abnormal Mobility of the Proximal Colon.** JOHN MORLEY, Manchester. *Lancet*, December 13, 1913.

1. Jackson's pericolic membrane is of congenital origin and is non-inflammatory. 2. It occurs in association with abnormal mobility of the proximal colon, due to a failure of fusion of the ascending mesocolon with the posterior parietal peritoneum. 3. The great omentum, from which Jackson's membrane is derived, is the most primitive agent in fixing the proximal colon to the parietes in the right loin. In cases of mobile proximal colon Jackson's membrane may be the principal means of fixing the colon. 4. Unless it causes kinking of the colon a pericolic membrane is therefore rather useful than harmful, and should not be divided. 5. The symptoms and pathological conditions found in association with Jackson's membrane (apart from mechanical obstruction due to the membrane) are primarily due to stasis in the abnormally mobile proximal colon, which is ill-adapted to the upright posture. 6. Surgical treatment should be directed to securing the normal position and fixation of the proximal colon by the operation of colopexy.

**Further Observation On the Complement-Fixation Test in Gonococcus Infection.** HARRY L. ROOKWOOD, Cleveland. *The Cleveland Medical Journal*, December, 1913.

Among some of the points emphasized by Rookwood are the following: In cases of acute gonococcal urethritis of short duration the blood serum shows no evidence of antibodies. In cases of non-specific acute urethritis of several weeks' duration the negative serum reaction is of much value. In cases of chronic urethritis in which gonococci were present in the discharge, the test was positive in almost every case. In chronic gonococcal urethritis of long duration where no cocci could be demonstrated in the discharge, 60 per cent gave positive reactions. The test is of great value in the cases which are clinically cured, especially when the question of matrimony is raised, for no man should be allowed to marry until his complement fixation test reacts negatively.

**Accidental Injuries to the Descending Portion of the Duodenum During Removal of the Right Kidney.** W. J. MAYO, Rochester, Minn. *Journal American Medical Association*, January 31, 1914.

Mayo points out that the anatomic relations of the retroperitoneal portion of the duodenum are such that this organ may be injured during operations for the removal of the right kidney when there is infiltration about the pedicle causing close adhesion to the duodenum. It not infrequently happens in such cases that the vessels are torn, causing hemorrhage calling for active hemostasis. In the attempt to check the hemorrhage by using strong biting forceps the duodenum may be seized and necrosis follow the injury with the resulting distressing fistulas and death. He has known three such cases and believes that the accident is more common than the records show. The vena cava is even more frequently injured and he thinks that the forceps is seldom necessary until after the vessels have

been caught and the hemorrhage stopped by the finger. Other arterial injuries are mentioned as liable to occur in such operations of kidney removal. When there is much infiltration and nephrectomy is not advisable, it is best that one should see that there is no opening into the peritoneum. The different characters of kidney tumors are noticed by Mayo, especially in malignant disease involving the pelvis and calices and other structures in which the duodenum is liable to be injured even by the most expert and careful surgeon. As a rule the duodenal injury is not made manifest for several days after the operation and the fistulas do not tend to heal. In a case like this, in which the fistula was large, infiltrated and without peritoneum, he would make a transperitoneal attack on the fistula itself before the patient becomes exhausted, lift the descending duodenum from its bed, suture the opening, transplant a flap of omentum across the suture line and finally make a jejunostomy for temporary feeding purposes. Such an operation, however, while easy to figure out on paper, is sufficiently difficult to make us careful to avoid the accident requiring it.

**Epididymotomy.** C. P. KNIGHT, Stapleton, N. Y. *Journal American Medical Association*, January 31, 1914.

Knight says excellent results have been obtained by him at the United States Marine Hospital, Stapleton, N. Y., with Eckel's method of operating for epididymitis. Instead of a blunt probe for puncturing the epididymis Knight uses a blunt-pointed needle, which he considers better, and he has employed local anesthesia in several of his cases which he thinks also more advisable. He agrees with Eckel that the operation should be the procedure of choice and that it should be early to avoid pus and abscess formation. Five cases are reported. His conclusions are summed up as follows: "1. There is immediate abatement of all symptoms for which the patients seek relief. 2. The tendency to relapse is nil. 3. The operative procedure is without danger as regards anesthesia, because the general anesthetics can be eliminated. 4. This operation, as compared with the other methods of treatment, is one of utmost importance from an economic point of view, not only to the patient, when loss of time from daily labor is considered, but also to the hospital in its economic administration, by greatly diminishing the number of days of treatment."

**A Method of Removal of Carcinoma of the Prostate.** R. HOWARD, London. *Lancet*, December 13, 1913.

This method is rather novel. First, an ordinary suprapubic cystotomy is performed and the bladder is packed with a sponge. In the lithotomy position a perineal incision is made and the rectum completely separated from the structures in front until the seminal vesicles are reached. At the same time the fibres of the levator ani are divided on each side so as to free the prostate and the base of the bladder laterally. The patient is then placed in the Trendelenburg position. The suprapubic incision is enlarged downward so as to admit the whole hand, and the peritoneum is stripped back from the bladder. The posterior layer of the triangular ligament is dissected from the pubis and the urethra divided distally from the fascia. The separation of the lateral aspects of the bladder and prostate is completed, and the prostate, still in its fibrous capsule, is brought out of the suprapubic wound. The base of the bladder is then amputated just above the line of entrance of the ureters and the bladder dropped back into position. A rubber catheter is passed along the urethra into the bladder and out through the suprapubic opening. Both wounds are closed with drainage. The after result in one patient was excellent.

**The Significance of Phleboliths.** J. HALL-EDWARDS, Birmingham. *British Medical Journal*, December 13, 1913.

The author calls attention to the unusual frequency with which shadows of phleboliths are found in x-ray examinations for suspected kidney stones. These shadows are seen either associated with renal calculi or without. In some of these cases the phlebolith shadows were only

found on the side in which pain had been experienced, and in all cases where phleboliths were present they were always more abundant on the affected side than upon the opposite one. In an experience covering over 20,000 radiographs, the author never saw phleboliths outside of the pelvic area. While rarely seen below 40 years of age, above this age they are fairly common. The phleboliths are usually found in the plexus of veins running along the side walls of the bladder, uterus or rectum.

**A Method for Determining the Size of the Cervix During Labor Through External Examination.** (*Eine Methode zur Bestimmung der Grösse des Muttermundes intra Partum durch äussere Untersuchung.*) F. UNTERBERGER, JR. *Zentralblatt für Gynäkologie*, January 24, 1914.

Unterberger bases his method upon the palpation of the contraction ring which can always be felt, he says. In brief, he finds that the contraction ring can be felt two fingers above the symphysis when the cervix is of the size of a dollar; at three fingers above the symphysis it is of the size of a saucer. When the cervix is fully dilated the ring can be palpated four fingers above the symphysis and is always horizontal, not oblique, as it is when the lower uterine segment is overdistended.

**Emptying the Uterus as One of the Methods of Treating Antepartum Eclampsia.** REUBEN PETERSON, ANN Arbor. *The Journal of the Michigan State Medical Society*, January, 1914.

Peterson believes that the high mortality rate of antepartum eclampsia, especially in private practice, is due to the following causes: 1. The wasting of valuable time in other forms of treatment before operative delivery is accomplished. 2. The selection of wrong method of delivery of the antepartum eclamptic, whereby the patient is subjected to prolonged anesthesia and trauma. 3. The resulting sepsis from improper technic in patients whose powers of resistance are greatly lowered by the action of the eclamptic poison.

In regard to the first cause, it has been recently shown that the time allowed to elapse after the first convulsion before the uterus is emptied is of the greatest importance even if no second convulsion takes place. Olin found that if the uterus was emptied one to three hours after the first convulsion, the mortality was 3 per cent; if, however, the patient was delivered only after six to twenty-four hours after the convulsion, the mortality rose to 28 per cent.

The operation should be the one which can be done most rapidly, with the least shock. The author favors vaginal Caesarian section, especially in primipara, in whom much valuable time is lost in manual dilatation of the cervix and who are subjected to very long anesthetics.

This treatment best adapted to the eclamptic mother is equally good for her child; hence immediate delivery after the first convulsion will result in a low fetal as well as maternal mortality.

**Chronic Cystic Mastitis.** E. S. JUDD, Rochester, Minn. *The Journal of the Michigan State Medical Society*, January, 1914.

Judd bases his report on 218 cases of chronic cystic mastitis operated on at the Mayo clinic. Of these eleven were in males. Seventy-nine per cent of the cases occurred in the cancer age. The author believes that chronic cystic mastitis has a definite relationship to cancer of the breast, and in many instances may be considered as a precancerous condition. In cases suspicious as to malignancy, a radical operation for cancer should be performed. In cases of chronic cystic mastitis that cannot either clinically or pathologically be diagnosed as to malignancy, the conservative amputation with removal of the gland-bearing fascia is the operation of choice.

The article is accompanied by a number of very excellent illustrations.

**The Heart in Fibroid Tumors of the Uterus.** JOHN A. GLINN, Chicago. *Surgery, Gynecology and Obstetrics*, February, 1914.

McGlenn has reviewed the autopsy material of the Philadelphia General Hospital (5,700 cases) and found 244 instances for study. He finds no basis for the belief in a "fibroid" heart. Although many cardiac lesions were discovered, there is no foundation for believing that the tumors were in any way connected with their development or their origin. Uterine myomata occurring in middle and advanced life are nearly always associated with sclerotic heart lesions which are a part of a general process. Large tumors may produce hypertrophy and secondary dilatation of the heart by pressure on the pelvic circulation. Anemia, too, may produce secondary lesions such as fatty degeneration, brown atrophy and cloudy swelling, but most of these lesions, even when found in connection with fibroid growths of the uterus, are caused by conditions foreign to the tumor.

**Gangrene of the Cervix caused by Injection of a Caustic.** (*Un cas de gangrène du col par injection caustique.*) A. HERRGOTT. *Annales de Gynécologie et d'Obstétrique*, January, 1914.

Herrgott's case was that of a multipara who, when two months pregnant, attempted to produce an abortion by injecting a concentrated solution of corrosive sublimate. This was done three times. A gangrene of the cervix, followed by a pyemia, resulted and caused the woman's death. At the autopsy the vagina was found cicatricial, the entire cervix gone, but the uterus normal. A purulent thrombosis of the pelvic veins disclosed the source of the fatal infection.

**Abderhalden's Reaction and Its Uses.** (*Ueber die Abderhalden'sche Reaktion und Ihre Anwendungen.*) R. AKIMOTO, Leipsic. *Zentralblatt für Gynäkologie*, January 10, 1914.

The author confirms the findings of others that the Abderhalden serum reaction can be used to diagnostic pregnancy in the human female. The human placental extract can be reduced with certainty by the serum of pregnant human females, but also, it would appear, by that of gravid cows, dogs and rabbits. The same reducing agent present in the serum is present also in the placental blood; but the extract of the umbilical cord is not reduced by the serum of pregnant women, nor is the reducing agent present in the amniotic fluid.

**Expulsion of an Ovarian Cyst Through the Anus During Labor.** (*Austritt eines Ovarialkystoms aus dem After Während der Geburt.*) R. MICHAELIS, *Zentralblatt für Gynäkologie*, January 24, 1914.

Michaelis reports the case of a multipara who was brought into the hospital after twenty-four hours of labor. The head was firmly engaged in the second position. Forceps were ineffectually tried, but at the same time the anus opened and a cyst-like mass protruded through it. After this, delivery was easy. The tumor proved to be an ovarian cyst which had broken through the anterior rectal wall under the influence of the labor pains. Laparotomy and repair of the rectal wall followed, but the patient died in a few days. The growth had undoubtedly been pushed down before the head, and the rectum bursting, had delivered itself in this manner.

**The Repair of the Flexor Tendons of the Hand; a Revised Technique.** C. Y. PAGE London. *Lancet*, December 20, 1913.

*Recovery of the cut ends of the tendon.*—The distal end can always be readily caught without disturbing the theca, flexion of the terminal phalanx being sufficient to bring it into the wound. In regard to the proximal end, the degree of retraction varies much and is greater in late than in recent cases, but in whatever situation the tendon may lie, a rule should be made never to incise the theca beyond the extent of the primary injury. The cut end of the proximal tendon should be sought for with sinus for-

ceps introduced into the theca through the primary opening; the tendon is made to descend as far as possible towards the wound by flexing the wrist-joint and massaging the forearm muscles. If by these means the tendon cannot be caught, it must be picked up through another incision made higher up in the manner described below. To carry out this procedure a flexible bullet probe with an eyehole cut in the bulbous end is required. In the fingers an incision half an inch in length is made directly over the line of the tendon at a level with the neck of the metacarpal bone; after division of skin, subcutaneous tissue, and the thin expansion of the palmar fascia, the sublimis tendon (lying close over the profundus) will be found very near the surface. The theca (in this situation frail and thin) is opened and the divided tendon or tendons are drawn out through the wound; the bulbous end of the probe is then passed from the primary wound through the theca and made to emerge at the secondary opening. A suture is fixed to the cut tendon and threaded through the eye of the probe. The probe is then drawn back and out again at the primary incision bringing the tendon with it.

In the case of the thumb a similar procedure is carried out, but the tendon must be picked up on the proximal side of the wrist-joint. A three-quarter inch incision is made extending upwards from the level of the wrist-joint directly over the ulnar border of the flexor carpi radialis tendon; this tendon is pulled to the radial side, the median nerve is gently displaced ulnarwards, and the tendon of flexor longus pollicis will be seen lying deep and between these two structures. The tendon will be lying slack, and on this account may appear a little like the median nerve. The theca is incised and the tendon pulled out. Sometimes it may not slip out quite readily; this is usually due to a failure to open the theca, which is thin and not very obvious in this situation. The probe is then passed and the cut tendon drawn back into the primary wound as described above.

**Fixation of the cut ends of the tendon.**—Any one of the advocated methods for suturing the cut ends may be employed; it should, however, be remembered that adaptation of the cut ends without causing any abnormal deviations is more important than close apposition of the cut surfaces. In some cases, especially in children, it is difficult to get a good hold of the tendon with the suture. In such cases the best plan I think is to hold the cut ends of the tendon successively, at their proper level in the theca; then pass a suture from side to side of the theca, piercing the tendon about a quarter of an inch from the point of section; tie the suture with sufficient firmness to hold the tendon in position. Simple iodized catgut should be used for this procedure. Though absolute apposition of the cut surfaces is not obtained by this means, the ends of the tendon lie in their normal relationship and quite close enough for satisfactory healing to take place.

**Torn Semilunar Cartilages.** WM. ROBINSON, Sunderland. *British Medical Journal*, January 17, 1914.

Robinson reports his observations of 24 cases. Of these 22 were tears of the inner cartilage, and two of the outer. The patients were all males, usually of the muscular, robust type. Robinson has never seen a simple dislocation of a semilunar cartilage without tearing of the cartilage. There can be a tear without a displacement, but no displacement without a tear. The author discusses fully the anatomy and mechanism of the injury. The diagnosis can be made entirely from the history. In nearly every case the following facts may be elicited:

1. A severe twist of the flexed knee or a severe blow on the side of the flexed knee, with or without the patient falling.
2. A sickening pain, and often a sensation of something having given way in the joint.
3. "Locking" of the joint, that is, inability to extend the limb (if the anterior part of the cartilage be torn) or, much less often, to flex it (if the rent is in the posterior half). The joint sooner or later goes straight of itself or by a special effort on the part of the patient, or is pulled straight by someone—generally with a feeling as if something had slipped into its place.

4. A temporary effusion into the joint (traumatic synovitis).

5. One or several recurrences of the above symptoms, especially of "locking" of the joint on slighter but similar accidents, such as slipping off a curbstone, twisting the leg in walking, or even turning over in bed.

When the patient applies to the surgeon often nothing can be made out on examination of the joint except some tenderness over the injured meniscus—inner or outer, as the case may be. If the femur has been rotated inwards (or the leg outwards) almost always the inner meniscus will be found torn. If the rotation of the femur is outwards (or of the leg inwards) one cannot be so certain that it will be the outer meniscus that will be found ruptured (see notes of cases).

The only treatment in workingmen is removal of the offending cartilage.

**The Importance of the Treatment of Weak Feet in Childhood.** BRAINERD H. WHITLOCK, New York City. *New York State Journal of Medicine*, January, 1914.

After showing how common a disability flat-foot is, as proven by records of the armies and navies of various countries, the author pleads for a more general recognition of this condition in childhood, at which time much of its dangerous character may be averted. Weak foot is the most disabling and widespread of all postural deformities affecting all classes of society and occupation. A decidedly large number of cases exist from early childhood. As a result of various causes, faulty attitudes are assumed for the feet which, though not necessarily causing disability in childhood, are nevertheless powerful factors for harm in adult life.

**Heliotherapy in Tuberculosis.** HERMANN VON SCHRÖTER, Vienna. *Medizinische Klinik*, December 21, 1913.

The author believes that the treatment of tubercular disease by means of exposure to the sun's rays, which is coming more and more into general use, is of as much avail at sea level as it is in mountain regions. The result depends not so much on the intensity of the light as on the duration of the exposure. Natural sunlight is of considerably more therapeutic value than artificial rays, such as those of the Quartz Lamp, though the latter may be of use to further the treatment on days when there is no bright sunshine.

Chemical work seems to show that the pigment which is developed in the skin after exposure to light is derived from breaking down of the Rete Malpighi cells, as a result of the light rays. These cells the author moreover considers as related physiologically to the adrenals.

Heliotherapy, although not as yet shown to be of definite value in pulmonary cases, has proven of undoubted efficacy in surgical tuberculosis.

**Primary Carcinoma of the Appendix.** LOUIS RASSIEUR, St. Louis. *The Journal of the Missouri State Medical Association*, December, 1913.

Rassieur reports two cases of primary cancer of the appendix, the first in a married woman of thirty-three who was operated on for uterine retroversion, the appendiceal lesion being a chance find; the second in a single woman of thirty-one, who gave symptoms of chronic appendicitis. The author reviews the literature of the subject, commenting on the fact that now that cases are studied more carefully, more cases of carcinoma of the appendix are finding their way into the literature, and the condition is no longer considered as great a rarity as it was formerly. The lesion is usually located at the tip of the appendix or within a centimeter of the tip. Its size varies from a pin-head to a small Mandarin orange. On section it is usually yellow in color. The rule is that these growths are relatively benign, do not form metastases, nor recur after removal.

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## THE NECESSITY OF CONSERVING THE INTERCOSTAL NERVES IN ABDOMINAL INCISIONS—AN EXPERIMENTAL STUDY.\*

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The longitudinal incision through the rectus muscle is of comparatively recent development in the various methods of opening the abdomen. It is used not only for the purpose of making a more liberal opening into the abdomen in certain conditions, but also to permit the closure to be made in layers and by imbrication. The earlier longitudinal incision through the linea alba had several objectionable features. The most important of these were, the high degree of traction necessary to overcome the bilateral pull of the transversalis and internal oblique muscles and the difficulty of obtaining solid union between the two edges of a single fascia. The incision was then made more and more lateral from the linea alba, until at present a great number of surgeons, both here and abroad, by preference make a liberal longitudinal incision through the rectus muscle at, or even external to, the central line of the muscle. This incision gives, especially in the upper abdomen, two firm fasciæ for closure, with the additional muscle cushion between them.

The incision is conservative with respect to the rectus muscle itself and perhaps to the deep epigastric and internal mammary vessels under the muscle, but it cuts transversely through all other important structures of the abdominal wall. These structures are chiefly, the fibers composing the fasciæ, and the intercostal nerves. The severed fasciæ can be made to reunite and the permanent damage to them may not be great, but the destruction of the nerves causes an enervation of practically all the tissues which lie in the space between the incision and the linea alba. That this enervation frequently results in a weakening of the supporting tissues and subsequent herniæ has been known for a long time. But what about the other structures involved? What about the peritoneum?

From time to time I have had occasion to operate

on patients who had previously been operated upon through lateral abdominal incisions placed in such a way as to sever intercostal nerves. The findings in such cases have suggested a possibility that the omentum may have a greater tendency to adhere permanently to that part of the abdominal wall which has been deprived of intercostal nerve supply than to any other part of the parietal peritoneum. The omentum is ever ready to adhere to damaged tissues, and it would not be strange if it had this tendency also with respect to enervated peritoneum.

To illustrate some of the observations referred to: A woman of 40 was operated upon for acute appendicitis. Misjudging the location of the appendix, the gridiron incision was made much too high. The tip of the appendix was found to be imbedded in the pelvis among loops of small intestines. The incision was then extended downward outside the semilunar line to a point near the groin. Naturally all nerve-fibers within the bisected zone were destroyed. There were no adhesions to the abdominal wall except at a point near the groin. Moist pads were used to wall off the infected region, and the appendicectomy was done without unusual mauling of the parietal peritoneum. The upper part of the wound was sutured and a drainage tube was inserted at the lower end of the incision. The wound discharged a small amount of pus during the following week but it was healed completely in three weeks. A year later this patient was operated upon again for post-operative hernia. At this time the omentum was found to be firmly adherent to the whole area of parietal peritoneum, lying between the incision and the linea alba. Similar post-operative adhesion formation has been seen in a few instances following a longitudinal incision over the gall-bladder. The omentum has been found attached internally from the line of incision, while on the external side the peritoneum appeared normal. It would seem that instrumentation and possible bile infection during the operation would have injured the peritoneum about equally on both sides of the incision.

A series of experiments on animals has been conducted by the writer, in an endeavor to learn whether or not the destruction of the intercostal nerves supplying the peritoneum would result in

\*Read before the Western Surgical Association, St. Louis, December 20, 1913.



any anatomical changes in the peritoneum, with special reference to adhesion formation.

The plan adopted was as follows:

GROUP I. Under aseptic conditions, to make an incision near the costal margin on one side and sever the last 3 or 4 intercostal nerves (the 12th, or subcostal, is included under the term "intercostal" throughout this paper); after some time, to explore the abdomen and learn whether the destruction of the nerves alone caused any changes in the peritoneum supplied by these nerves.

GROUP II. To open the abdomen through the linea alba, in a number of animals, the incision to be placed in the lower part of the epigastrium so that the peritoneum supplied by the last four intercostal nerves could be easily reached; to traumatize the parietal peritoneum on each side of the incision and to exercise the greatest care that the degree of injury inflicted should be as nearly alike on the two sides as possible; to close this incision; and lastly to make a second lateral incision and sever the lower intercostal nerves on one side.

GROUP III. To perform the same operations, traumatize the peritoneum and cut off the nerve supply on one side, and to add an irritant or a mild infection to the peritoneum, and in the same dosage to each side of the abdomen.

The trauma was inflicted by rubbing the peritoneum on both sides with fingers or forceps wrapped in a definite amount of gauze; by rubbing the same number of times and in the same direction on each side; and by using as nearly as possible the same amount of force to each side.

The irritant used was a weakened tincture of iodine. The infection was a solution of gastric or intestinal contents obtained from the same animal on which it was used. It was assumed that an auto-genous infection of bacteria would be more easily overcome by the animal than foreign bacteria, which might originate an uncontrollable peritonitis.

All these means and methods are fairly accurate and easy of application, except the necessity of applying an exactly equal amount and kind of force to each side in making the trauma. This must depend on the judgment and experience of the operator, and cannot be mathematically accurate. However, I believe it possible to exercise sufficient care in bruising the peritoneum by hand to make the margin of error almost negligible. In a series, this margin of error would probably break even for both sides.

Three experiments were made in Group I, extirpation of intercostal nerves without disturbing the peritoneum. In Group II, 8 animals, 5 dogs and 3 rabbits, were used. An incision was made in the

linea alba, the peritoneum was rubbed equally on both sides, the wound closed, and then the lower intercostal nerves were excised on one side through a second incision. In Group III, 7 experiments were made. The peritoneum was rubbed on both sides through a median line incision, then tincture of iodine was applied in two animals, gastric contents in two, and intestinal contents in three. After closing the median line incision, segments from the 10th, 11th and 12th intercostal nerves were removed near the costal margin on one side. It might be added that the solutions used, both of iodine and of gastric and intestinal contents were very weak.

#### REPORT OF OPERATIONS AND EXPERIMENTS.

##### GROUP I.

##### Dog No. 1.

Operation, February 8, 1912. Under strict aseptic precautions an incision was made along the left costal margin from the epigastrium to a point near the crest of the ilium. The incision extended through the muscles and to the fascia transversalis. The last five intercostal nerves and the ilio-hypogastric were dissected out and a segment of each extirpated. The wound was closed.

February 19, 1912, an exploration was made through a median line incision in the epigastrium of the same dog. There were no adhesions to the parietal peritoneum anywhere. The peritoneum appeared normal. The wound was closed in layers, the peritoneum being touched only to suture the edges together.

Another incision was then made along the right costal margin through the muscles and through the fascia transversalis. The last five intercostal nerves were dissected out and a section removed from each. The wound was closed. All wounds healed without suppuration.

March 6, 1912, the abdomen was reopened for examination. The omentum was found slightly adherent over the middle third of the peritoneal suture line in the epigastrium. The peritoneum on both sides had a normal glossy and transparent appearance.

##### Dog No. 2.

Operation, April 29, 1912. An intestinal resection was made on this dog through a median line incision at the umbilicus. The loop of bowel was lifted out of the abdomen and surrounded with moist gauze during the operation. The parietal peritoneum was not touched with gauze. The wound was carefully closed in layers.

A second incision was then made across the lower ribs on the right side, 3 cm. from the costal margin

and segments from the 10th, 11th, and 12th intercostal nerves extirpated.

Autopsy, May 20. There were no adhesions to the parietal peritoneum.

#### GROUP II.

##### Dog No. 3.

Operation, March 11, 1912. A 10 cm. incision was made in the linea alba with the center of the incision at the umbilicus. The parietal peritoneum was rubbed with two fingers wrapped with four layers of gauze. The fingers rubbed rather gently forward and back twice on each side, care being taken to reach a point equidistant from the incision on each side, and as far as possible to apply an equal amount of force on each side. The wound was closed in layers.

A second incision was then made along the right costal margin and the five lower intercostal nerves severed and partly extirpated.

Abdomen reopened May 24, 1912 (74 days after operation). The omentum was found adherent along the greater part of the suture line, the adhesions extending 2 cm. to the left and 4 cm. to the right of the linea alba.

##### Dog No. 4.

Operation, May 30, 1912. Median line incision 8 cm. long was made in the epigastrium. The parietal peritoneum was rubbed once forward and back on each side as far as the fingers could reach. The index and middle fingers were used, wrapped with four layers of gauze, fresh gauze being used on each side and care being exercised to apply an equal amount of pressure on both sides. The wound was closed.

A second incision was made along the left costal margin. The 9th to the 12th intercostal nerves, inclusive, and also the ilio-hypogastric were severed in the bottom of the incision; the vessels were ligated and the wound closed.

Autopsy, June 10, 1912 (11 days after operation). The omentum was adherent to the anterior parietal peritoneum over a triangular surface. The base of the triangle corresponded to the suture line under the linea alba and the apex to a point 5 cm. to the left of the incision. The triangle of adhesions lay entirely to the left of the incision. The adhesions were very firm; traction tearing the omentum did not loosen the adhesions. The peritoneum appeared thickened on the operated side.

##### Dog No. 5.

Operation, April 28, 1913. An 8 cm. incision was made through the linea alba, the umbilicus at the middle of the incision; parietal peritoneum was rubbed twice forward and back with two fingers

wrapped in four layers of gauze; fresh gauze was used for each side and the same amount of pressure; wound closed carefully in layers.

Second incision made at right costal margin; the last four intercostal nerves were carefully dissected out through slits in the transversalis muscle and the segments excised; neither intercostal vessels nor transversalis muscle fibers were severed.

Autopsy, May 13, 1913 (15 days after operation). There was a firm omental adhesion along the scar in the linea alba. The adhesion was practically confined to the right side of the incision and covered roughly a rectangular area 4 x 6 cm. in extent.

##### Dog No. 6.

Operation, April 28, 1913. Median line incision 8 cm. long through the umbilicus; parietal peritoneum rubbed on each side with two fingers wrapped in three layers of gauze; three strokes ( $1\frac{1}{2}$  excursion) were made with gentle and equal pressure on each side; wound closed with catgut in peritoneum and silk in fascia.

A second incision was made over the left costal margin and the 9th to the 12th intercostal nerves, inclusive, were destroyed. Wound closed.

Autopsy, May 13, 1913 (15 days after operation). Omentum was feebly adherent over an area 5 x 5 cm. at the lower end of the incision. The adhesions extended an equal distance on each side of the incision.

##### Dog No. 7.

Operation, May 1, 1913. Median line incision from 5 cm. above to 3 cm. below the umbilicus. Four layers of gauze were wound around 2 fingers which were introduced towards the lumbar region, pressed firmly against the abdominal wall and then withdrawn, causing a rubbing toward the incision. This was repeated 3 times on each side, each zone of rubbing being a little higher than the previous. Fresh gauze was used for each side. The abdominal wound was carefully closed with interrupted silk sutures in each fascial layer.

A second incision was made across the ribs midway between the costal margin and the vertebral column on the right side. The last four intercostal nerves were dissected out between and below the ribs, and the segments removed. The intercostal vessels were not wounded. The wound was closed.

Autopsy, May 17, 1913 (16 days after operation). Omental adhesion along whole length of incision; adhesion 2 cm. wide and attached entirely to the right of the line of incision. Peritoneum thickened on the operated side.

## Rabbit No. 1.

Operation, April 30, 1913. Incision through linea alba in epigastrium; peritoneum on both sides rubbed hard once forward and back with one finger covered with gauze; wound closed; three lowest intercostal nerves on left side excised through incision across ribs behind costal margin.

Autopsy, May 12, 1913 (12 days after operation), rabbit (female), found dead; had been pregnant and miscarried after the operation; right uterus found empty; left uterus contained unexpelled rabbits, and placenta, but the placenta were detached. No visceral adhesions to abdominal wall; but on left side of linea alba was a transverse line of fibrin deposit adherent to the peritoneum.

## Rabbit No. 2.

Operation, April 30, 1913. Midline incision in epigastrium; peritoneum rubbed firmly twice from the lumbar muscles toward the edge of the wound with artery forceps wrapped with gauze; the same on both sides; wound closed. Second incision at left costal cartilages and segments of the last three intercostal nerves extirpated.

Autopsy, May 19, 1913 (19 days after operation). Hernia of abdominal wall on left side; peritoneum roughened and omentum adherent at one point 2 cm. outside semilunar line on left side; adhesion 2 cm. in width.

## Rabbit No. 3.

Operation, September 2, 1913. Incision through the linea alba from the center of the epigastrium to a point below umbilicus; parietal peritoneum rubbed equally on both sides with one finger wrapped in two layers of gauze, fresh gauze for each side; wound closed in layers with catgut. Second incision made across costal cartilages on the left side and sections of the last four intercostal nerves extirpated. Wound closed with catgut.

Autopsy, September 16, 1913 (14 days after operation). No adhesions to the parietal peritoneum. Peritoneum appeared normal on the right side, while on the left it was thickened and had a dull grayish white color over the area between the incision and the costal margin.

## GROUP III.

## Rabbit No. 4.

Operation, April 30, 1913. A median line incision, 5 cm. long, was made in the upper abdomen. One finger, covered with two layers of gauze, was swept over each side of the abdomen once forward and back. A piece of gauze carrying a few drops of tincture of iodine was touched gently to each side of the bruised peritoneum. Care was exercised that the sides of the abdominal wall should be given

equal treatment. Wound closed. Second incision made at the left costal margin and the 10th, 11th and 12th intercostal nerves and vessels severed. The incision severed practically all tissues down to the peritoneum.

The rabbit died three days after the operation. Autopsy showed the colon adherent to the anterior abdominal wall, the adhesions being decidedly more extensive on the left side. Intestine and liver stained with iodine. No adhesions between viscera.

## Rabbit No. 5.

Operation, September 2, 1913. Incision through linea alba at the lower part of the epigastrium. Dry gauze was wrapped around a Carmalt artery forceps and one hard rub made over the parietal peritoneum on each side; a piece of gauze containing a small amount of tincture of iodine was then touched to each bruised surface. The sides were treated as nearly alike as possible. After the treatment a faint iodine stain could be seen on each peritoneal surface. Wound closed with catgut.

Second incision at left costal margin through most of the muscle fibers down to the peritoneum; the last five intercostal nerves were severed and segments removed; three of the intercostal vessels were saved. Wound closed with catgut.

Autopsy, September 27, 1913 (25 days after operation). Whitened and thickened peritoneum over rubbed area on left side; right side normal. A lobe of the liver was firmly adherent at the central part of the traumatized area on the left side; no other adhesions.

## Rabbit No. 6.

Operation, September 16, 1913. Median line incision at the center of the abdomen. Both sides of the parietal peritoneum were rubbed once forward and back and once in a dorso-ventral direction with an artery forceps wrapped in gauze. A small amount of gastric contents was obtained with a hypodermatic syringe and diluted one drop in 4 cc. of sterile water. From this solution 4 drops were run over each side of the bruised peritoneum. Wound closed.

Second incision at the right costal margin where the last 4 intercostal nerves were extirpated and nearly all tissue fibers severed to the peritoneum. Wound closed.

Autopsy, October 28, 1913 (42 days after operation). An adhesion from stomach to linea alba at central part of incision. Peritoneum is whitened on both sides of the middle line to nearly the same degree.

## Rabbit No. 7.

Operation, September 16, 1913. Median line in-

cision in epigastrium; with a forceps wrapped in gauze one rub was made over the peritoneum from before backward and another from the lumbar region toward the margin of the wound, on each side. A hypodermatic needle was inserted into the stomach and a few drops of liquid contents obtained. One drop of this was diluted with 4 cc. sterile water and 3 drops from this solution were allowed to trickle over the rubbed peritoneum on each side. Abdominal wound was carefully closed.

Segments were then removed from the 10th, 11th, and 12th intercostal nerves through a second incision at the left costal margin. Wound closed and sealed.

On October 28th (42 days after operation), this rabbit was again opened in the linea alba immediately below the previous operation. There were no adhesions to the abdominal wall anywhere. Condition of peritoneum not noted. Desiring to obtain a stronger infection, a hypodermatic needle was inserted into the colon. In the absence of liquid bowel contents, it was found necessary to inject 5 or 6 cc. of sterile water which was again withdrawn through the needle. A 10% dilution in sterile water was then made from the contents of the syringe. Four minims from this solution was then spread evenly over the peritoneum on each side of the incision. Wound closed.

Autopsy, November 20, 1913 (23 days after second operation). An omental adhesion was found to exist on the left side between the first incision (September 16) through the linea alba and the semilunar line. The adhesion was over 3 cm. wide. (This adhesion was not present at the time of the second operation, October 28th.) The peritoneum on the left side was thickened and whitened from the linea alba to a line corresponding with the left costal margin. The peritoneum on the right side showed no such whitening, but appeared quite normal.

Rabbit No. 8.

Operation, October 28, 1913. An incision was made in the linea alba above the umbilicus, 10 cm. long. With a finger wrapped in four layers of gauze, the peritoneum was rubbed six times from before backward. A solution was then made with a hypodermatic syringe from colon contents in the same manner as in rabbit No. 7. Six drops of this solution were spread evenly over each side of the bruised peritoneum. Wound closed.

The 10th, 11th and 12th, intercostal nerves were then severed along the costal region on the left side. Another nerve, apparently an accessory from the 12th intercostal, was dissected out and excised. All

intercostal blood vessels involved were severed and ligated. Wound closed.

Autopsy, November 20, 1913 (23 days after operation). The peritoneum was whitened opposite the median line incision on both sides. The whitening was decidedly more marked on the left side than on the right. There were no adhesions to the line of incision, but on the left side in the center of the whitened area five cm. from the linea alba was a firm omental adhesion two cm. in diameter. Dog No. 8.

Operation, November 5, 1913. Incision through linea alba at umbilicus 10 cm. long; the peritoneum rubbed on each side four times forward and back with forceps wrapped in gauze; liquid contents obtained from a loop of ileum with needle. This was diluted 1 to 10 in sterile water and three drops of this applied to the rubbed peritoneum on each side. Wound closed. Second incision across lower ribs on right side and 10th, 11th, and 12th intercostal nerves severed five cm. behind costal margin; all intercostal blood vessels intact, hence may not have destroyed all nerve filaments.

Autopsy, November 19, 1913 (14 days after operation). Peritoneum whitened and thickened on both sides opposite abdominal incision, but decidedly more so on the right where it extended beyond the costal margin; on the left it extended but slightly beyond the semilunar line. Omentum adherent to the central portion of the incision. The adhesion extended four cm. toward the right side, while on the left it barely crossed the linea alba.

In looking over the results from the experiments in Group I, we find that the absence of intercostal nerve supply alone, without the addition of trauma, caused no adhesions and no macroscopic changes in the serosa. No sections were made in these cases to compare the two sides microscopically.

In Group II, absence of intercostal nerve supply plus trauma, there is a difference between the two sides of the animals in all cases but one. The difference varies in degree, but it has a constant relation to the side deprived of nerve supply.

The individual resisting or recuperating power which varies so widely in the human, undoubtedly plays a rôle in lower animals also. This resistance depends upon tissues aside from the nerves and may account in some measure for more thorough restitution in one enervated peritoneum than in another.

The rubbing in the first experiments was done with less severity than in the later cases. There was no precedent to follow, and it seemed best to feel the way gradually. The amount of force ap-

plied to the peritoneum was probably not much greater than that exerted by some surgeons while pushing gauze pads roughly into the abdomen, and, after the operation, carelessly jerking the pads out. In the later experiments the rubbing was done a little more energetically, yet in no instance to such a degree that subserous hemorrhages could be seen.

The peritoneum in the rabbit is very thin and delicate and undoubtedly it received a much harder rubbing in proportion to its strength than did the peritoneum of the dogs. As a probable result of this, there was found in the rabbits a more constantly appearing infiltration of the peritoneum than in the dogs. The omentum of the rabbit is very short and does not lend itself to adhesions as readily as that in the dog. In most of the dogs there were omental adhesions along the line of the peritoneal incision in the linea alba. This can be accounted for chiefly by the fact that the edges of the peritoneum were rubbed and handled more roughly than the distant parts. Tincture of iodine was used very freely on the skin and some of this drug, no doubt, added insult to the peritoneal margin. But in all cases where adhesions extended farther from the linea alba on one side than on the other the adhesions favored the enervated side.

Microscopic sections taken from the whitened areas of the peritoneum on the enervated side and compared with similarly situated sections on the normal side showed that the subserosa was much thicker in the former than in the latter. This thickening seemed to be due to a round-cell infiltration and an edema, which was absent on the normal side, two to three weeks after the operation. This tends to show that repair is delayed where the nerve supply has been removed. It proves that nature makes a noble and partly successful effort to repair the damage even in the absence of nerve supply, but that this repair suffers from a lack of that control which makes for rapid and perfect result.

A mild trauma or infection on a healthy peritoneum induces a temporary adhesion which may be released after the healing process of the serosa has been completed and absorption has taken place. These experiments suggest that in the absence of intercostal nerve relations the infiltration becomes more chronic, the healing defective, and therefore a more reluctant release of the adhesions is to be expected.

Very decided results were seen in the two rabbits where iodine was applied to the peritoneum. One died undoubtedly from bowel obstruction due to the adhesions to the parietal peritoneum. The adhesions were much more extensive on the enervated side, though by no means confined to that side. In

the other rabbit the whole rubbed area on the operated side was whitened and thickened and a lobe of the liver was adherent in the center of the area. The peritoneum on the other side appeared normal.

The combined injury from the rubbing and the iodine was probably greater than that applied in any other experiment. This suggests that if a higher degree of damage were inflicted on the peritoneum than that used in any of these experiments, the difference in reaction between the normal and the enervated side would be much more striking.

The two experiments with gastric contents were practically negative. The rubbing was made with forceps wrapped in gauze and was applied more gently than in most experiments. The gastric contents of a rabbit probably contain but few bacteria and in the small dose applied to the peritoneum even those few may have been missed, so that no additional reaction was called forth.

The intestinal infection used was very feeble, if indeed present in all cases. Yet in all the three instances where it was applied after rubbing, there were omental adhesions on the operated side and none on the normal side. Of special interest is the case where no adhesions were present after the application of gastric contents but an adhesion formed after colon infection was added.

In the case of a female rabbit having a miscarriage after the operation, it is interesting that the uterus on the side of intercostal nerve extirpation had been unable to empty itself. Whether this was merely a coincidence or whether the nerve destruction on that side had any influence on the uterine contractions, it is impossible to state.

If only the trunks of the intercostal nerves are extirpated at the costal margin or even between the ribs, one cannot be certain that the whole area supplied by these nerves is totally enervated. This may be true even if we overlook the probability that the nervi vasorum have some function beside that of strict vasomotor control. Nerve filaments may come off from the main trunk behind the point where the nerve is severed and pass unharmed in the transversalis fascia in the zones between the nerves. To obviate this possibility, the lateral incision in such experiments should sever all the tissues down to the peritoneum. This is exceedingly difficult to do, without damaging the peritoneum, and it was attempted in only a few of the experiments. It is probable therefore that the enervation was not so complete in any of the experiments as that produced in a laparotomy with a lateral longitudinal incision.

The question of time was not considered in these

experiments. The adhesions as a rule covered only a small part of the rubbed area, and the more recent ones were not very firmly attached. It must be admitted that some of them might have disappeared in course of time; but the majority of the adhesions certainly were too firm to promise any such outcome.

To analyze the results of the fifteen experiments in which trauma, or trauma plus irritation or infection, was applied on the parietal peritoneum: we

#### CONCLUSIONS:

A destruction of the intercostal nerves without trauma to the peritoneum does not cause any macroscopic change in the peritoneum.

A perfect healing of a mildly traumatized peritoneum may occur after the intercostal nerve supply has been severed.

If a weak irritant or infection be added to the trauma, the serosa may still recuperate.

But if a peritoneal surface deprived of its inter-

TABULATION OF EXPERIMENTS AND RESULTS.

Experiment No.	Trauma &c. inflicted to peritoneum each side of linea alba	Intercostal nerves cut	Examination (exploration or autopsy)	Results
<b>GROUP I.</b>				
Dog No. 1.....	Abdomen not opened.....	Left....	11 days after op.	No adhesion, peritoneum normal.
Same dog.....	" " " " " " " " " " " "	Right....	16 " " " "	Slight adhesion to incision, peritoneum normal.
Dog No. 2.....	Intestinal Resection..... (no rubbing)	Right....	21 " " " "	No adhesion.
<b>GROUP II.</b>				
Dog No. 3.....	Rubbed with gauze.....	Right....	74 " " " "	Omental adhesion extending 2 cm. to left and 4 cm. to right from linea alba.
Dog No. 4.....	" " " " " " " " " " " "	Left....	11 " " " "	Omental adhesion 5 cm. wide, entirely to left of linea alba.
Dog No. 5.....	" " " " " " " " " " " "	Right....	15 " " " "	Peritoneum thickened on left side only.
Dog No. 6.....	" " " " " " " " " " " "	Left....	15 " " " "	4x6 cm. confined to right side.
Dog No. 7.....	" " " " " " " " " " " "	Right....	16 " " " "	5x5 cm. distributed equally on both sides.
Rabbit No. 1...	" " " " " " " " " " " "	Left....	12 " " " "	2 cm. wide, all on right side. Peritoneum thickened on right side.
Rabbit No. 2...	" " " " " " " " " " " "	Left....	19 " " " "	No adhes. Fibrin deposit on left. Incomplete abort in left and complete in rt. uterus.
Rabbit No. 3...	" " " " " " " " " " " "	Left....	14 " " " "	Omental adhes. 2 cm. to left of lin. semilun. Hernia on one side.
<b>GROUP III</b>				
Rabbit No. 4...	Gauze rubbing plus Tr. Iod..	Left....	3 " " " "	No adhes.
Rabbit No. 5...	" " " " " " " " " " " "	Left....	25 " " " "	Colon adherent both sides, mostly on left.
Rabbit No. 6...	Gauze rub plus gastr. cont..	Right....	42 " " " "	Liver adherent on left side. Peritoneum thickened on left.
Fabbit No. 7...	" " " " " " " " " " " "	Left....	42 " " " "	Stomach adher. to incision. Peritoneum the same on both sides.
Same Rabbit...	Added intestinal contents.	Left....	23 " " " "	No adhesions.
Rabbit No. 8...	Rubbing plus " " " " " " " " " " " "	Left....	23 " " " "	Omentum adherent and peritoneum thickened on left side.
Dog No. 8.....	" " " " " " " " " " " "	Right....	14 " " " "	" " " " " " thickened on left side.

find that in eight the adhesions (seven omental and one hepatic) were confined to the side of nerve extirpation; two of the three cases having adhesions on both sides of the linea alba had more extensive adhesions on the operated than on the normal side; one case had fibrin deposits which were limited to the enervated side; and one rabbit having no adhesions had a marked infiltration of the peritoneum on the operated side, thus leaving only three animals in which no material difference between the two sides was noted. An ineffectual attempt to infect the peritoneum with gastric contents had been made in two of these three negative experiments.

It can be stated, therefore, that in 80% (12 in 15) of the experiments made to determine whether or not a destruction of intercostal nerves supplying parietal peritoneum is of pathological significance in regard to this peritoneum, the answer was, in greater or less degree, positive.

If further experimentation and observation should sustain the evidence which I have ventured to present, it will tend to discourage the use of every incision which deliberately separates peritoneum from its nerve supply. It will add another strong argument in favor of transverse abdominal incisions.

costal nerve supply be subjected to a trauma, or to a trauma plus infection or irritation, such as may obtain during an operation, more adhesions and a more chronic infiltration of the peritoneum is likely to follow than if the same injuries were inflicted on a peritoneum with normal nerve supply.

I wish to express my appreciation to Dr. J. F. Corbett, Associate in Surgery at the University of Minnesota, for much valuable help and advice in this work.

#### COMPOUND LACERATIONS OF JOINTS.

Compound lacerations should have the following treatment:

1. Sterile field by swabbing with tincture iodine.
2. Cleanse bone with instruments, never touching it with sponges, fingers, etc.
3. Reduction with little trauma.
4. The opening closed by accurate approximation of all injured tissues, skin closed without drain. Inject joint with formaldehyde-glycerine solution, immobilize and put up in extension, if hip, knee or elbow or shoulder injuries. If temperature high and tension great, aspirate and inject more formaldehyde solution. If the sutures do not hold and joint thoroughly pussy, treat as an open infection of joint and drain thoroughly.



## THE PARALYTIC CONDITIONS OF CHILDREN — TREATMENT FROM THE GENERAL PRACTITIONER'S STANDPOINT.

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The recognition and treatment of the paralytic affections of childhood is of such importance that their reiterations should act as a stimulus to practitioners and specialists alike—the former to be on the alert to detect paralytic phenomena; the latter, to institute proper measures for their treatment.

I shall limit my remarks to the commoner forms of paralysis, as seen at the Hospital for Deformities and Joint Diseases where we have given about sixty thousand treatments in the past seven years to paralyzed children.

(1) *Central Congenital Lesions*: We find that cerebral birth palsies occupy an important place. These are general due to mechanical rupture of meningeal vessels, and secondary invasion of the motor zone by blood clot. The diagnosis of this condition presents no difficulties. There is usually a history of difficult labor. After a very little time, it is noticed that the child's extremities are rigidly adducted. Walking, perhaps, is impossible on account of the adductor spasm. The reflexes are exaggerated, the highest tap producing a violent response. If the later tracts have degenerated, we may find a Babinski reaction and ankle clonus. There is little or no atrophy; the electrical reaction is normal or decreased. Where there is a cortical agenesis or defective cortical development, there may be flaccid paralysis, due to maldevelopment of the lateral tracts. The reflexes in electrical reactions are, as a rule, normal, and moderate atrophy may be present.

(2) *Acquired Cerebral Palsy*: In the acquired type of cerebral palsies, we find hemiplegia the most prominent. These are associated with infectious diseases, cardiac conditions, surgical operations, or they may develop without any definite cause. A large percentage of these cases are syphilitic, no doubt. The history of the case and symptoms make the diagnosis easy. There are exaggerated reflexes, rigidity; normal electric reaction; no atrophy.

(3) *In Encephalitis, Spinal Meningitis with Paraplegia, Hemiplegia, or Monoplegia*, with or without a history of previous illness, we find flaccidity and mild atrophy; reflexes, absent or present; reaction, normal or not.

(4) *The Paralysis Due to Spinal Cord Lesions*, the most important of which are anterior poliomyelitis and compression paraplegias. The diagnosis of anterior poliomyelitis presents little or no difficulties. The history is one of previous well-being with the sudden onset of acute illness followed by a flaccid paralysis, which may affect any or most of the muscles of the body. Atrophy is an early condition in the affected muscles. There is also vasomotor paresis, giving the limb the characteristic blue, cold appearance. Reflexes are lost early, and the reaction of degeneration in the affected muscle completes the picture.

(5) *The Compression Paraplegias* of interest to us are those occurring in Pott's disease. The previous history pointing to the spinal affection and the kyphus would call attention immediately to the cause of the paralysis. There are pains radiating to the abdomen or down the legs, depending upon the location of the lesion; weakness, ataxia; paralysis; exaggerated reflexes; ankle clonus and Babinski phenomenon. In compression of lumbar segments, in addition to paraplegia, there appears involvement of the sphincters. The electrical reactions are normal; there is no atrophy early. Treatment, rest and counterextension.

(6) *Multiple Neuritis*: In paralysis due to peripheral causes, multiple neuritis takes first rank. This is usually a sequel of diphtheria or other infectious diseases. The paralytic phenomena in this condition appear slowly. Sensory symptoms are distinguishing features, and consist of pain, tenderness and hyperesthesia along the course of the nerve trunk. Foot- and wrist-drop finally appear and clinch the diagnosis. Atrophy and the reaction of degeneration appear soon after the paralysis. In a few cases of multiple neuritis of sudden onset with little or no sensory symptoms, the condition may be mistaken for anterior poliomyelitis, and a positive diagnosis between both conditions may be impossible. The course of the disease will finally help us. A history of diphtheria or exposure to the disease naturally counts in favor of multiple neuritis.

(7) *Facial Palsy*: Under facial palsy of Bell's type, I would suggest to the general practitioner to place a bent hairpin with a string attached, in the mouth, and tie the other end of the string tightly to the ear, in order to correct the deformity of the face. The exposure of the eye must be attended to also.

(8) *Traumatic Paralysis*: I come, now, to a form of paralysis of traumatic origin such as Erb's palsy, in which the parent is advised between treatments

to keep the patient's arm in contact with the chest, thumbs up; that is, supination and external rotation. Also in this group are ischemic paralysis, Volkmann's paralysis, occupational paralysis, and the paralysis of surgery, as of mastoid operations, fracture of the humerus, or where scar tissue of other foreign material has prevented the nerve from reuniting. No method of treatment (other than nerve surgery) seems to have any effect on the last mentioned severed nerve variety, with the exception of disruptive high frequency.

(9) *Muscular Dystrophy*: Most important in this group are pseudo-muscular hypertrophy and the muscular atrophies of Aran-Duchenne and Charcot-Tooth-Marie. The characteristics of the hypertrophies are their onset in early childhood and distinct hereditary manifestation. A progressive enlargement of certain muscular structures, notably the thigh and calf, and a corresponding diminution in their motor activity until total helplessness supervene, are the diagnostic features. The reflexes are retained and the electrical reactions are diminished but never lost.

In the muscular atrophies, the onset of gradual wasting in early childhood of either the hands or legs, distinguish this type of disease. The reflexes disappear when atrophy is well advanced and the reaction of degeneration is present in the affected muscles.

In a brief article of this kind only some general ideas can be given with regard to treatment. Should a brace be deemed necessary to prevent deformity, or for some other equally good reasons, it should be taken off daily for normal use of the limb, and must be removed when it has served the purpose for which it was originally applied. Before applying the brace, some tenotomies may have to be done to place parts in functioning position.

If the range of motion is limited, perhaps a tenotomy is indicated or stretching of the shortened muscle, or reefing the lengthened tendon. Hold the limb in an over-corrected position to stretch the opposing muscles. Sometimes silk tendons are used to steady the joint; sometimes the muscle or tendon is transplanted, or the joint may be ankylosed or resected. In a number of instances of spastic paralysis, resection of the posterior spinal nerve roots have seemed to improve the cases somewhat, as also has decompression operation on the skull in hemiplegias.

If a brace is used to prevent or correct the deformity, it should be taken off every day for a few hours and the child encouraged to make an effort to use the part involved, even if there is no re-

sponse to the effort. During convalescence, where the arm is involved, the good arm should be placed within the clothes. In all methods of treatment, the reflexes, without doubt, play a most important part towards affecting a cure.

Continuous attention, not only by the mother and physician, but by the patient himself, must be urged, so that the child *mentally* tries to improve its nerve force of the part involved. As a thought conveyed to the brain may induce blushing, laughter, fear, increased appetite, etc., so can a thought to improve the circulation of any part of the body be taught to a child, by mental effort. Keeping a brace on continuously, the patient loses the value of the mental effort, and the physical action, and tends to increase muscular atrophy. Atrophy is synonymous with disuse; use and metabolism go together.

These patients tend to show an improvement for a given length of time, but there is a time when improvement comes to a standstill; some muscle or muscles seems to have lagged. This is the time for renewed effort or surgical intervention.

The office treatment consists in the application of some form of energy. As we all know, each of the different forms of energy such as heat, light, electricity, vibration, magnetism, sound, nerve force, are converted under certain conditions into one another; nerve force into light, as in the fire-fly; nerve force into electricity, as in the electric eel.

Any method of treatment that will improve the general health, such as medication, hygiene, fresh air, etc., or will improve the metabolism of the part involved, is good treatment. Also as massage, vibration, mechanical devices, heat, white light, electricity and last, though not least, psycho-therapeutic exercises, or muscle culture education, with reflecting mirrors, so the patient can easily see the part involved. The limb treated must be slightly flexed when the floor muscles are involved so as not to have the muscles in strain under treatment by any of the modalities.

I shall not describe the different forms of electrical currents, as galvanic, faradic, mixed, D'Arsonval, sinusoidal, high frequency, high tension of Oudin, Tesla, O'Farrel, but a thorough knowledge of the galvanic is primarily essential to understand the actions of the others, so I shall speak only of galvanic electricity, which can easily be obtained from the street current.

It is well at this point to briefly review the phenomena of electrical reactions in general to a galvanic current. In a healthy muscle, electrical stimulation from a faradic or galvanic coil produces a sharp response. A paretic muscle gradually loses

that irritability to response, so that very strong currents are necessary to produce contraction. A good diagnostic point is the feebleness of response and the wormlike character of the contraction. In complete reaction of degeneration, the muscles will not react to the strongest faradic or galvanic current.

The normal reactions are K C C followed by

A C C  
A O C  
K O C

This reaction is different in degenerate muscles, A C C producing the greatest contraction, so that in the use of the galvanic current it is advisable for many reasons to place the anode on the paralyzed muscles.

Do not imagine that you are going to strengthen a muscle or a nerve by pouring electricity into it. Stress animates, strain destroys tissue.

The time spent in the application of an interrupted galvanic electric current (Interrupted 72 to 110 times per minute, synchronously with the pulse), should not exceed five minutes daily, using not over 10 milliamperes of current, or the least amount that will produce a reaction; it is advisable early to use the anode on the paralyzed muscle, while the cathode which should be of a very large size, is placed centrally. If the cathode is used upon the paralyzed muscle, it must be continuously moved in order to prevent an excoriation. Before the current is used upon the patient, the limb should be thoroughly heated and after being treated with electricity the part is massaged for from five to ten minutes; then the patient goes through a course of voluntary therapeutic exercises, mention of which was made before. This educational exercise, no doubt, has more therapeutical value in the spastic cases than any other method of treatment. It is also used in all forms of paralysis with much benefit, and as before mentioned the mental effort should be used by the patient at home, morning, noon, and night.

#### THE PRE-CANCEROUS STAGE.

Clinical observation has shown that the life history of most cancers shows alterations in the tissue antedating the development of malignancy, and the plain teaching follows that such alterations in known cancer sites should be attacked surgically before malignancy develops. Such a course would constitute an efficient cancer prophylaxis.—M. N. HADLEY, in *The Journal of the Indiana State Medical Association*.

## STRAIGHT DIRECT LARYNGOSCOPY, BRONCHOSCOPY AND ESOPHAGOSCOPY.

RICHARD HALL JOHNSTON, M.D.,

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BALTIMORE, MD.

(Continued from March Number.)

*The writer's method of direct laryngoscopy.* The different steps of the examination will be described in detail because the method differs materially from all other methods with which the writer is familiar. The two essential points of difference are the tube which has been described above and the position of the head which in nearly every case is practically straight when the instrument is introduced. Long ago the writer became convinced that relaxation of the neck muscles was the most important point in successful tube work. He believed that if such a method could be devised, direct laryngoscopy would become more popular and thereby more useful. No one will deny that the extended position of the head is unnatural and that it must be more difficult for patient and operator with all the muscles contracted. The operator must overcome this unnatural position by pulling against muscles that are already straining. The position originated by the writer has been used by him in adults and children for more than four years and has proved eminently satisfactory from every standpoint. It is easy to learn and will prove satisfactory in every patient regardless of physical conditions.

The patient is seated on a low chair which has proven more satisfactory than a stool because of the straight back against which the patient leans. The head, reaching just above the back of the chair, in most cases is held perfectly straight and supported in the hands of a nurse. The nurse is instructed not to hold the head but simply to support it. The operator stands to the left or right of the patient according as he wishes to enter the mouth from the corresponding side of the mouth. The pharynx is anesthetized with the curved applicator, alypin being used for this purpose as was pointed out under the chapter on anesthesia. After waiting a minute or two the instrument described above is introduced with the left hand between the left or right bicuspid teeth while the patient is instruct-

ed to turn his head slightly to the right or the left to bring the instrument and the larynx in the same straight line. As the tube passes down, the tongue is easily pushed to the opposite side completely out of the way. In a few seconds the epiglottis comes into view. At this point it may or may not be necessary to apply more alypin through the tube with the straight applicator which is carried directly into the larynx. The handle of the laryngoscope is now slightly depressed which throws the spatula end against the wall of the pharynx. The handle is now raised at the same time that

possibly Mosher's "left lateral route" which is used under general anesthesia. Brunings has said that it is not necessary to make special mention of the advantage presented by gaps in the teeth and that it is a much more important question whether in the case of protruding incisors or lateral gaps the spatula should be introduced from the corner of the mouth. He also says that autoscopia from the corner of the mouth requires far more practice, and that normally as he ascertained by a series of measurements, the autoscopic pressure is no less in this case than with the medial method of examination;

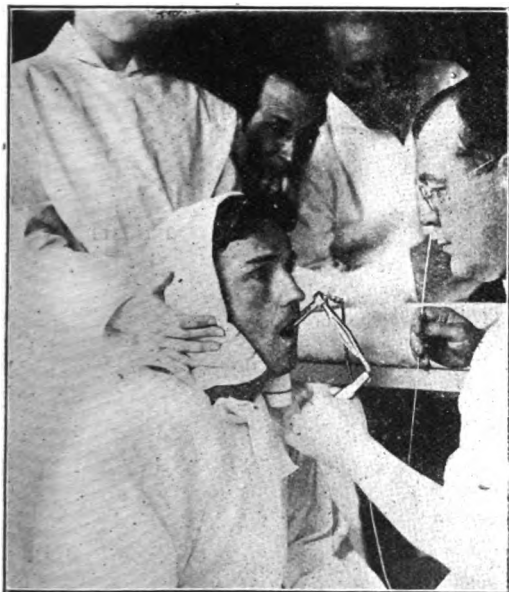


Fig. 6. Straight direct laryngoscopy. Patient and operator sitting. Ten millimetre tube introduced between the left bicuspid teeth. This is the usual position for operative procedures in adults. In exceptional cases the head is extended somewhat.



Fig. 7. Direct laryngoscopy with the head bent forward giving just as good a view of the entire larynx as with the head straight. The instrument is the 10 millimetre tube. Patient and operator sitting.

the spatula end is pushed down for a variable distance but never more than an inch. Now by pulling gently on the instrument the entire larynx is seen. It is surprising how little force is used to expose the larynx and sometimes it seems almost as if the weight of the speculum does this. If, perchance, the anterior commissure is not seen clearly, the nurse is told to push the head gently forward. The writer has repeatedly demonstrated that with the head bent forward, just as good a view of the larynx is obtained as with the head straight. The invariable custom is to start the examination with the head straight. Occasionally in short thick necks or in young girls, it may be necessary to extend the head very slightly as the larynx is exposed. These cases are rare so that the proper name for the position of the head is the straight position. The writer knows of no other position in which the head is practically straight or bent forward throughout the examination and treatment except

that this at first appears surprising, because the corner of the mouth can be more easily brought into line with the prolongation of the trachea than can the upper row of teeth. That the reason is that, when the tube is placed laterally, pressure is not exerted on the middle of the tongue but nearer to its lateral attachment which is less yielding. This method is, therefore, only to be recommended in the special cases mentioned above. In answering these objections of Brunings it is only necessary to say that with the instrument used by the writer, one does not have to consider the advantage presented by gaps in the teeth; the tube slips in so easily that one scarcely knows when he is in the larynx and practically no pressure is exerted on any part of the tongue. As regards his claim that the corner of the mouth requires more practice, it can be said that visitors in the writer's clinic often succeed in passing the laryngoscope at the first attempt and are amazed at the ease with which the tube slips

into the larynx. The writer has made no measurements to learn the difference in the force used between the medial and lateral methods. But he knows from actual experience that it is much easier to pass his tube from the corner of the mouth with the head straight than between the incisor teeth. The photographs of the two positions will show the difference in the amount of force used better than any description. In any method of direct laryngoscopy, it is always well to pull the patient's lip up and out of the way of the tube for the pinching of the instrument may break up an orderly examination.

#### THE EXAMINATION OF THE LARYNX IN THE PRONE POSITION.

Under this heading will first be described the



Fig. 8. Direct laryngoscopy with the head bent far forward. The entire larynx is seen. It is a "freak" method never used in operative work. It shows that extension of the head is not necessary if a small tube is used.

methods under general anesthesia and then those which are practicable and useful with and without local anesthesia.

*Mosher's method.* In 1908 Mosher suggested a new method of examining the larynx and the upper end of the esophagus in his "left lateral route." So far as I know the method cannot be used without general anesthesia which is a disadvantage. The patient's head is turned to the left until the left cheek almost touches the plane of the table; the chin is then flexed on the chest. The operator sits on the left facing the patient's head and introduces the special spatula between the left bicuspid teeth, pushing the tongue to the opposite side. When the epiglottis is reached, it is hooked forward and the larynx is exposed. The instrument is used with an electric head light or with a light on the end of it. This method has not become popular because of the difficulties attending its use and be-

cause simpler methods have been devised. The position of the patient is awkward and it is difficult to learn to introduce the instrument quickly. It is more useful in upper esophagoscopy than in laryngoscopy.

*Jackson's method.* Dr. J. W. Boyce, working with Dr. Chevalier Jackson, has perfected a method of holding the head which is probably the best position, with the head extended over the end of the table. Jackson, in his book on tracheo-bronchoscopy, emphasizes the importance of having a trained assistant hold the head since it must be held just right if one is to work successfully. In this position the head and shoulders of the patient project over the end of the table; the assistant sits to the right of the operator with the right foot on



Fig. 9. Straight direct laryngoscopy with the ten millimetre tube introduced between the left bicuspid teeth. Adult male. Local anaesthesia. This position is rarely used because practically all adults can be successfully examined and operated upon in the sitting position with the head straight.

the floor and the left foot on a low stool while the left arm rests on the left leg and the head on the hands. The operator sits on a low stool and with the head in proper extension passes the laryngoscope between the incisor teeth. The epiglottis, coming into view, is lifted and the larynx exposed. There are several disadvantages connected with this method, *viz.*: it requires the services of a trained assistant which are easy to obtain if one works always in the same hospital or can carry his assistant with him. If, however, he cannot obtain his assistant, it is difficult to do successful work. The instrument is suspended in the air with the left hand the forearm tires rapidly so that it cannot be long held in the strained position. In the writer's earlier work he had a patient with a tumor of the left anterior cord which was impossible of removal in the sitting position because the throat would not tolerate the large instrument then in use. The

patient was given ether and an attempt made to remove the tumor with the head in the Boyce position. It was found impossible to remove the growth because it was too far forward to see clearly. The writer's experience probably accords with that of many laryngologists in the early days of direct laryngoscopy. The large size of the instrument and the position of the head were drawbacks impossible to overcome. In the above case the patient did not return because of the sore throat from the large instrument. Today that tumor could be removed in a few minutes with the improved laryngoscope and the proper position of the head under local anesthesia. The cramped position of the operator on a

the neck to produce slight extension. The operator stands at the left of the table facing the patient's head and introduces the small laryngoscope between the bicuspid teeth with the left hand. The head is then turned slightly to the right and the instrument pushed rapidly down to the epiglottis which is hooked forward and the larynx exposed. The writer has succeeded in examining the larynx with this method when it was not possible to do so in the sitting position. The only assistant needed in adults is someone to stand at the head of the table out of the way of the operator to steady the head. This method is seldom used except for purposes of demonstration. Nearly all patients can be



Fig. 10. Straight direct laryngoscopy. Instrument passed between left bicuspid teeth. Girl 17 years old. No anaesthesia. Patient not held.

low stool is another objection to the Boyce position, and lastly the fact of having the assistant in front of the operator is no small inconvenience. After trying the position faithfully, the writer concluded that he would have to simplify the work or give it up as too difficult.

**Brunings' method.** The position of the head is practically the same as in the Jackson method except that Brunings' allows the head to fall over the leaf of the table which has been let down. He thus dispenses with an assistant to hold the head. In passing his instrument, it is held in practically the same way as the Jackson tube. In all these positions of the head, it is difficult to work without general anesthesia. In the method to be described, one can operate under local anesthesia if necessary.

**The writer's method.** The patient lies on the table with the head straight, or, if the neck is short and thick, with a small pillow under the back of

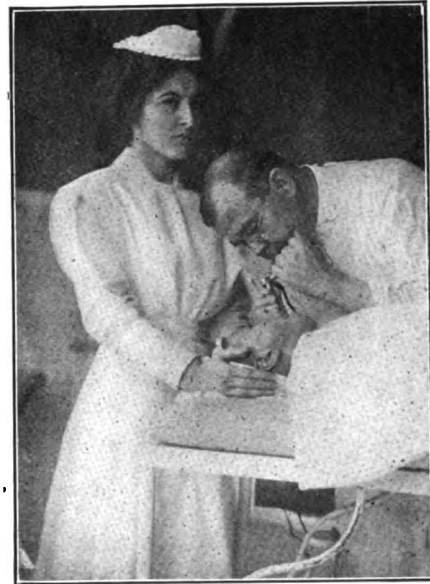


Fig. 11. Direct laryngoscopy with the head straight on the table. Boy five years old. Patient not held. This was a patient with papillomata of the larynx who was repeatedly operated upon with the head straight. No anaesthesia, local or general was ever used. The patient has made a good recovery.

examined under local anesthesia in the sitting position. The writer cannot imagine a condition in which it would be necessary to give a general anesthetic for direct laryngoscopy except in children above the age of six years.

**Direct laryngoscopy in children.** This is the field in which direct laryngoscopy has its greatest usefulness. Before its introduction, the larynx in children was one of the darkest chapters in medicine. The inability of most laryngologists to see the child's larynx was not due to lack of skill but to the natural difficulties to be overcome. Even under general anesthesia with the child sitting, the difficulties of pulling the tongue out and removing secretion were so great that in many cases only a fleeting glance could be obtained and a correct diagnosis was impossible. In older children the examination was easier but in many cases the chil-



dren were hard to manage and results were far from satisfactory. Now, thanks to direct laryngoscopy, all this is changed and the treatment of diseases of the larynx has become an open book. Everyone must admit that direct examination is of more importance in children than in adults; but even greater difficulties are encountered as regards the size of instruments all of which are too large or too awkward in shape to expose the larynx quickly and easily. To see the child's larynx satisfactorily one must have a tube large enough to see and operate through, and at the same time small enough to be passed quickly without trauma. The

the straight position, devised by the writer more than four years ago and used continuously by him since. Mosher's method can be used in children if general anesthesia is used.

*The writer's method of direct laryngoscopy with the patient sitting.* This method can be used in children up to eight years of age. The patient is pinned in a sheet so that movements of the arms and legs are reduced to a minimum. A nurse or assistant holds the child in the lap with the legs between the knees. Another nurse holds the head straight. The operator, standing to the left, passes the tube between the bicuspid teeth, forces the



Fig. 12. Straight direct laryngoscopy. Ether anaesthesia. Instrument passed between incisor teeth. Boy 17 years old. Jackson's large separable speculum used preparatory to passing 9 millimetre bronchoscope which accounts for the fact that the head is not perfectly straight on the table.

instrument used by the writer has proven satisfactory in all cases during the past four years. It is the same tube which was described above as the most satisfactory in adults. It may be well to emphasize what was said about anesthesia under that chapter. The writer has not used anesthesia, either local or general, in the laryngeal work of children for four years. This statement refers to children under six years of age and he cannot think of a condition, operative or otherwise, which would compel its use. Anesthesia adds an element of risk which in the present state of knowledge, is not justifiable. Jackson, so far as I know, still uses the Boyce position in his work in children. The method of procedure does not differ from that described above except that he does not use anesthesia of any kind. The head is forcibly held over the end of the table during the examination or operation. While this position works fairly well, it cannot compare with

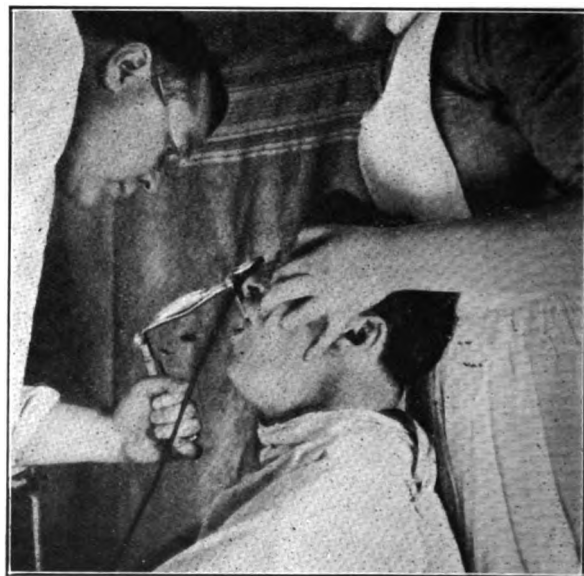


Fig. 13. A particularly difficult case of small papilloma on the left vocal cord just at the anterior commissure. With the small tube, exposure and removal were comparatively easy.

tongue to the opposite side, and when the epiglottis appears, hooks it forward with the spatula end of the instrument, and exposes the larynx. If necessary slight backward pressure may be made on the thyroid cartilage.

This method is described for the benefit of those who prefer to examine in the sitting position. The writer prefers the prone position because he thinks it is easier to control the patient. In this method the child is pinned in a sheet as above described and placed on the table with the head straight and steadied by a nurse, while a second nurse attends to the arms and legs. The operator stands to the left, facing the patient and passes the tube between the incisor or bicuspid teeth; he then pushes it rapidly down to the epiglottis, which is hooked forward or better upward and all parts of the larynx exposed. The examination, if one is at all expert, takes only a few seconds. This is an ideal method of examining the larynx in children because they

are under perfect control. One who has tried to examine the larynx with the head extended has been struck with its difficulties—it is almost impossible to keep the head still enough to introduce the tube; the position of the instrument suspended in the air is awkward and a great strain on the forearm while the operator is in a cramped position. Last, but by no means least, the position of the head and the instrument are unnatural, so to speak. The sitting position, while not so objectionable, is difficult enough on account of the struggles of the child. Contrast with these the position in which the head lies straight on the table; the nurse stands at

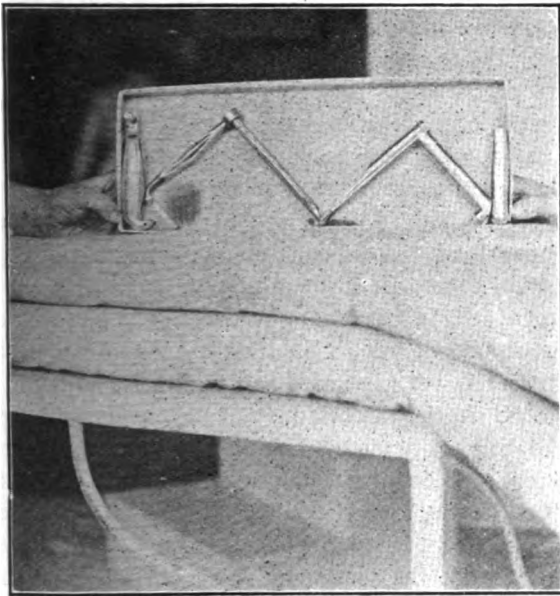


Fig. 14. Instruments used in direct laryngoscopy. To the left is the small modified Jackson tube with detachable handle so that the instrument can be used in the sitting or the prone position. To the right is the small separable speculum with detachable handle.

the head of the table to steady the head out of the way of the operator; the operator stands at the left in an easy attitude; in other words all the participants in the examination are in positions that are easy and free from strain. When one has tried both methods, no argument is needed to convince him of the superiority of the straight method.

In Brunings' book the writer has looked in vain for any special method of direct laryngoscopy in children so it is fair to assume that he uses the same methods as in adults. Nothing as to anesthesia is found except the table of the percentage of general anesthetics used in Killian's clinic. He does refer to the operative cases in children as being the most difficult in direct laryngoscopy.

No such objection can be made to the straight method for with a little experience it is one of the easiest procedures in surgery. That direct laryngoscopy is not used by every laryngologist as a

routine measure is due to the multiplicity and the large size of the instruments. The writer is convinced of this from conversations with laryngologists all over this country. They say that they have invested in this or that instrument but that it is impossible to get a good view of the larynx. Some of them say that they have given up the work in disgust. This is a sad commentary on direct laryngoscopy which is one of the most useful procedures ever introduced into medicine. A short time ago a laryngologist from a neighboring state visited the writer's clinic to see direct laryngoscopy. He stated that he had just paid a big price for another laryngoscope which had proved unsatisfactory in that he had not been able to remove a tumor from the anterior part of the larynx because the



Fig. 15. Direct operation on larynx (with general anaesthesia and counter-pressure autoscopia). Brunings.

large instrument had caused the patient so much pain from the pressure used to see the larynx. This man had studied under Von Eicken in Freiburg and had paid about \$30.00 per lesson for instructions from him. He talked as if he were disgusted with direct laryngoscopy. The ease with which the small modified tube was introduced and the larynx exposed to the anterior commissure made a profound impression upon him. To show him just what the possibilities of the instrument were, the patient's head was bent far forward with the result that just as good a view of the larynx for operative or examining purposes was obtained. In this position he was shown that with a bright light as the De Zeng lamp, one could easily see to the bifurcation. When he insisted upon an explanation, the writer told him that it was the instrument and no skill on the part of the operator. When he left, he said that he would soon have another laryngoscope. This story is inserted to show the impression made upon out-

siders by the small tube. Recently Mueller has made two tubes for the writer measuring respectively 18 and 14 centimetres in length and 10 millimetres in the inside diameter for use with the Brunings electroscope. They are easily introduced but the writer prefers the modified Jackson tube for reasons stated above.

*Comparison between direct and indirect laryngoscopy.* It cannot be denied that one can see lesions better through the direct laryngoscope than with the mirror or the pharyngoscope. But for ordinary office work it is better to use the mirror or the pharyngoscope because they do not take as much time. One who is expert with the mirror can usually make a diagnosis with little difficulty. In a few cases with a low hanging epiglottis and a large uvula, great difficulty may be experienced in getting even a glimpse of the larynx; in these cases the pharyngoscope usually fails us also. The main objection to the pharyngoscope is the distorted and unnatural image that any prismatic instrument gives. In children the writer never resorts to the pharyngoscope but examines with the direct laryngoscope at once so that, if an operation is necessary, it can be done immediately. If the mirror fails, it is the proper thing to resort to direct laryngoscopy at once; if, with the mirror, uncertainty as to diagnosis prevails, the direct method is used to get a better view of the larynx. A patient came to the writer some months ago with aphonia. Because of a low hanging epiglottis and an unusually sensitive pharynx, it was not possible to get a view of the vocal cords. Even after the use of cocaine the larynx could not be seen. With the small tube the larynx was examined directly and a diagnosis promptly made. To sum up it may be said that the mirror is the instrument of choice in routine office work; that in those cases in which the mirror or the pharyngoscope fails, the examination can be successfully made with the direct instrument; that in children it is a waste of time to try the mirror or the pharyngoscope because the examination by the direct method is quickly made and the operation, if necessary, can be performed at the same sitting. For all operative procedures in the larynx, the direct should always be preferred to the indirect method because one can see so much better what he is doing. For operations in the anterior commissure, the mirror has an element of uncertainty which makes its dangerous.

*Mistakes in passing the direct laryngoscope.* The most common mistake in passing the tube is probably pushing the spatula end of the instrument too far down back of the larynx. The patient immediately begins to choke and

to make attempts to pull the instrument out. The mistake should be rectified by gently pulling the tube up until the arytenoids appear when the epiglottis is pulled forward. This mistake is more apt to happen with a large than with a small tube because with the large tube the muscles are on the stretch which makes orientation more difficult. With the small tube, passed slowly, it is practically impossible to miss the epiglottis and arytenoids. Another mistake by beginners is the attempt to pass the tube too rapidly. Direct laryngoscopy should be done slowly and carefully especially if it is the patient's first experience. The writer thinks that one of the greatest mistakes is the use of a large instrument which always requires more or less pressure on the tongue and gums. One difficulty which all laryngoscopists have to deal with occasionally is the choking sensation experienced by the patient; this can usually be overcome by gentle manipulation of the instrument and reassuring the patient that by breathing quietly nothing can happen. The writer has never had this difficulty since he has been using the small tube. In former days with the large instrument it was a common occurrence. The advice that Brunings gives to give up the examination if the throat is very irritable and to instruct the patient to return the next day is not necessary with the use of the small tube. The writer has never seen a patient who could not be successfully examined at the first attempt with the straight position of the head and the use of the small tube provided the patient is not the victim of some chronic nervous disease such as chorea, etc.

(To be continued.)

#### HAND INFECTIONS.

To deal with hand infections successfully with the preservation of the greatest functional results, one must have a very definite mental picture of the anatomy of the part. It matters little whether you can name the structures, provided you know the function of the various structures and their relative positions. In infections, the most essential anatomical structures are the various tendons and their synovial sheaths. The tendons, because if they are destroyed or left fused together, movement in the parts supplied by them ceases. The synovial sheaths, because by their presence infections are easily disseminated and their effects rendered more disastrous. The lymphatics, which in the forearm and arm play so important a rôle in the spread of infections in those localities, may be disregarded in considering the spread and treatment of hand infections.—IRVING S. HAYNES, in the *N. Y. Medical Journal*.

## THE EPIPHARYNX IN CHILDREN.

E. M. HOLMES, M.D.,  
BOSTON, MASS.

We can almost make the statement that the only importance of the epipharynx in children as well as in adults lies in its association through the Eustachian tube with the ear, for with few exceptions we are called upon to treat this area for some resulting or threatened aural pathology. As over 90 per cent. of all pathological conditions met with in otology are due directly or indirectly to some pre-existing pathology within the epipharynx and Eustachian tube the study of this area becomes the foundation upon which rests otology. Anything which we can do to prevent aural complications or anything which we can avoid doing that may be liable to result in conditions favoring otological disease should be followed with as keen interest and care as the more spectacular and brilliant procedures to combat the later advancing disease in the middle ear, mastoid cells, labyrinth and cranium. The majority of us will agree concerning this subject and yet there is not one of us to whom it is not more fascinating to perform the major surgery than it is to carry out the sometimes protracted and tedious work of discovering and removing the frequently seemingly less important etiological conditions within the epipharynx. The ideal which we must strive to attain is to be able to not only diagnose all the pathological conditions within the epipharynx but to be able to so combat and eradicate them as to prevent their extension into and their effect upon the aural structures. This ideal opens up a field which will doubtless give lack of interesting research for many years to come. I believe that by improved methods and with more definite knowledge we shall be able to preserve more and more ears and thus prevent a great loss of proficiency not only to the individual but to society in general.

Since 1885 when Emil Mayer presented the result of his studies upon the epipharyngeal hyperplasia of Waldeyer's ring of glandular tissue, volumes have been written concerning this subject. But today, in spite of all that has been written on adenoids in children we find there is so much concerning etiology, treatment and prognosis that is in doubt that we cannot make a positive statement that can be applied in general to this common condition. Our knowledge concerning the acute and chronic inflammations of the epipharynx, whether due to local infection or existing as sequelæ of various pathological conditions of other organs, is also so far

from positive that we must still continue to study them in order, if possible, to establish sufficient facts so that we shall be able not only to make a correct diagnosis of epipharyngeal disease but, in a large percentage of cases, be able to ascertain the etiological factors producing these pathological changes; and shall also know when and how to proceed with the treatment, operative or other, for the best future as well as the immediate results in the individual case. Some will think it strange that I should raise the question in regard to epipharyngeal adenoid hypertrophy, for they will say, "If there is adenoid hypertrophy, just remove the growth and that will be the end of the trouble." I wish it were so.

We all know that there are many children who are afflicted with middle ear disease who have adenoid hypertrophy and are entirely relieved when this adenoid obstruction is removed, and we also know that there are many other cases which are helped for a short while and then become as bad as before. Some of these have recurrence of adenoid hyperplasia but many do not. Some cases are not helped in the least by an adenoid operation and may be even worse than before. Quite frequently we find in children, as well as in adults, a marked tendency to epipharyngeal and tubal disturbances with the resulting aural complications, who have anatomically an apparently normal nose and epipharynx. Again there are many cases where some deformity is found in the nose or post-nasal space and when these are corrected there is no apparent improvement. We have only to review the special literature to see how prone we all are to become narrow in our observations and to consider our subject as that of an isolated field free from external influences. Although it is at present not possible with all our aids in investigation to always feel sure of our ground it is our duty so far as it is within our power to consider abnormal conditions within the epipharynx from various viewpoints before deciding upon a course of procedure.

Before I took up my special study of the epipharynx I questioned why there should be such a difference in the results following apparently the same operation for apparently the same pathological conditions; but I had not reckoned sufficiently with the various resulting influences of the same amount of excessive tissue due to the difference in shape and size of the epipharynx and the varying position and patency of the Eustachian tube nor had I given sufficient consideration to the resulting cicatricial tissue which follows the usual operative interference for the removal of the epipharyngeal adenoid mass.

The adhesions found in the lateral fossæ, the semi-atrophic areas sometimes found in the vault of the epipharynx with the resulting interference with the pharyngeal end of the Eustachian tube, in patients operated upon by our most skillful throat surgeons, make us stop to question. While we are studying this subject we can easily become pessimistic and be led so far toward the side of no surgical interference as not to be conservative. It is not the purpose of this paper to court pessimism but to present some facts which will show that we are but beginning to learn the rudiments of the subject which has been so studied, hashed and rehashed for nearly 30 years.

Were it not for cicatrices and their effect upon the Eustachian tube the subject of adenoids would be of little importance for, with our present knowledge, the immediate resulting effects of the adenoid operations are very rarely bad and frequently the individual is improved in many respects. The results are so excellent in many severe cases that the physician of moderate training and ability as well as the guardian of the child is frequently led to think of an adenoid operation for all the ills of childhood from indigestion to enuresis. During the past few years it has become the pastime of the mediocre family physician to advise and try to perform an adenoid operation upon every child who shows any symptoms of ill-health. In many cases little is accomplished or little trauma produced but often the walls of the lateral fossa are injured, and I have even seen the mucous membrane and also the cellular tissue removed to such an extent as to bare the bone in epipharyngeal vault.

The unskilled work in the epipharynx does not concern us so much here; but the work performed by our school physician and nurses, complemented by the hospital out-patient clinic, does. The school children in our cities are referred by the young school physician and conducted in droves by the school nurses to the various clinics and we, as a rule, are prone to give them a quick glance and then pass them on to the young interne or assistant surgeon for operation. I believe in this manner we are committing one of the greatest medical crimes of this generation for a large percentage of the children not only do not need an operation in the epipharynx but would be far better off without it. Under the usual methods of examination, it is easier for the overworked men in the clinic to pass on to the operating room these cases than to carefully examine them and disagree with the school physician; but I believe we should select all doubtful cases and have two or three men

in the clinic pass upon them and then, if thought best, refer them back to the school physician stating at time of examination we did not deem operation advisable but would like to again examine the patient if symptoms should ever arise suggesting naso-pharyngeal disturbances.

There can probably be no cause for discussion concerning the advisability of removing a large central adenoid mass which hinders respiration or presses upon the cushion or overlies the pharyngeal orifice of the tube but in these cases great care should be used so as to avoid injuring the cushion of the tube while removing the adenoid tissue; and our whole duty has not ended with the operation, however skillfully performed. These patients should be examined within a few weeks after the operation to learn if there has been healing without adhesion or other deformity. If we can impress the advisability of this examination upon the guardian of the patient as well as upon the medical profession in general we shall have done much to protect our patients against evil or unsatisfactory results which sometimes follow the operation for the removal of adenoid hypertrophy.

One of the reasons for presenting this subject is to ask have our methods of examination in the past been such as to enable us to so carefully diagnose the conditions in the epipharynx as to tell what cases need surgical interference and what cases will best be cared for by other means? In marked cases we can say *yes*, but in a large number of cases we must say *no*.

With the naso-pharyngoscope it is possible in the majority of children over 4 years of age to inspect the epipharynx while at rest and during the act of deglutition. This has been of great assistance and satisfaction to me in all these cases where the nasal passage was sufficiently large and the child was under control, but in younger children and in those who are timid and cannot be controlled, it is frequently difficult and sometimes impossible to pass the instrument through the nose. The epipharyngeal space is small and digital examination is frequently misleading even with a long slim finger. In these cases it is usually impossible to satisfactorily examine with a post-nasal mirror, for the child in resistance and crying closes the pharynx from the epipharynx. I have been very anxious to examine these little patients as I could older ones for the knowledge gained by vision is usually much more definite than that of speculation or even that of palpation. Last Spring I devised a tubular speculum which can be slipped behind the soft palate and, by sliding the retractor, will carry the soft parts

so far forward as to expose the whole epipharynx. The naso-pharyngoscope passed into the speculum lights up and gives a view of the entire epipharynx. This method is not as good as the one of passing the endoscope through the nose for there must be some distortion produced by any instrument which draws upon the palate. It is not possible to observe the effects of deglutition but it is an advance and a great aid in the examination of those cases which cannot be examined through the nose. It shows perfectly the amount and location of the adenoid, its relation to the tube, the general condition of the pharyngeal end of the tube and the condition of the posterior ends of the turbinates. It can be used by anyone of ordinary ability and little more time is necessary than for the use of a tongue depressor in the inspection of the pharynx. With the patient's head held firmly by a nurse or assistant and with a gag between the teeth it is possible to use this instrument even in a resisting child.

In a great many cases where there is a low type of middle ear disease, and where there is some obstruction to normal breathing, and where without special study of the case we would be tempted to advise immediate adenoid operation, we are able to so change the habits and hygiene of the child as to get relief of the existing interference and to prevent the liability of its recurrence. It is surprising how quickly epipharyngeal disturbances will arise as soon as the patient is subjected to the overheated and excessively dry air of our modern heated and often poorly ventilated rooms and it is equally surprising how quickly such a patient will improve as soon as more moisture is added to the living and especially to the sleeping room. We have all seen children with epipharyngeal hypertrophy with the associated and resulting symptoms after having lived in unhygienic surroundings during the winter go in the springtime out into the open country and sleep in the normally moist air and begin to immediately improve of their symptoms. An examination of these cases in the autumn frequently reveals no pathologic condition. We realize that there are many children coming to our clinics from very poor surroundings for whom little can be done to change the unhygienic mode of living, yet in these cases we may be able to accomplish something through the aid of the social service workers. Efforts in this direction are often more important for these unfortunate little patients than the simple operative measures performed more or less as a matter of routine. In all of these cases where there is any doubt as to the advisability of operating for adenoid or other naso-pharyngeal conditions the time which would be necessary to carry out operative procedure will in

most cases be sufficient to place them in the proper departments for general investigation and many can be given relief for the existing symptoms.

Many cases of epipharyngeal inflammation hypertrophy are due to septic foci within the nose and are relieved by treatment of the existing nasal disease. Deformities within the nose are frequent etiological factors in producing epipharyngeal inflammations and hypertrophies, and their correction often results in the relief of these conditions. Too often we see, especially in children, operative procedures within the epipharynx when the fundamental cause of all existing trouble is within the nose. A good view of the posterior nares will often give a clew of the etiologic rôle played by the nose. If there is marked hypertrophy of the posterior ends of the turbinates or if there is a purulent secretion flowing over them we can often find the source of the trouble within the nose. Until these causes are relieved we can not expect any permanent relief of the resulting pathology within the epipharynx.

Having considered the general associations of epipharyngeal disease in children we now come to the subject of therapeutics, which is naturally divided into general and local. Although the general therapeutics is frequently fully as important as the local it has to deal with the treatment of so many systemic conditions that may act as etiological factors in epipharyngeal disturbances that it is too extensive to be discussed here except in a very general way. Gastro-intestinal disturbances must receive attention. The epipharynx in childhood, as well as in adults, is almost always affected by attacks of indigestion and constipation; and diet, together with measures to regulate and so far as possible correct these defects, is of great importance. Malnutrition and anemia are not always the result of epipharyngeal inflammation and swelling but are often etiological factors in these conditions. This fact should be kept in mind as we should not subject these patients to local treatment until we have carefully studied their general condition and have eliminated as far as possible all contributing causes.

Children who are subject to acute epipharyngeal inflammations should be warmly but not excessively clothed. They should be given all the fresh air possible, but they do not withstand excessive draughts of air especially while sleeping. They should be given sufficient exercise but more care is often necessary with them while they are at play than with the child of greater resistance. They must be more careful after becoming heated not to sit in draughts or lie upon damp cold ground. It is often difficult to decide how much care to exer-



cise in any case. We must not coddle them too much nor should we make them too apprehensive of trouble every time they happen to be exposed to draughts or dampness. We must try to gradually harden them to exposure but nothing is gained if we carry our hardening methods beyond a point followed by healthy reaction. In the anemic and frail child who is very prone to frequent and often severe attacks of epipharyngeal inflammation as well as in those who suffer from a chronic condition, the syrup of the iodide of iron is often of considerable service.

The infections of the epipharynx being almost always associated with similar infections of the nose and frequently associated with like oro-pharyngeal infections often demand treatment simultaneously with these adjacent cavities. In epipharyngeal infections, as aural complications are frequently of great importance it is essential that early treatment be applied which may prevent severe aural extension. In the early stages of congestion of the nose and epipharynx the patient, if possible, should be placed in a room with plenty of warm, moist air. A small dose of Dover's powder with some hot drink often aids by stimulating the skin to greater activity. A saline or a dose of oil is advisable especially when the child is inclined to be constipated. In young children we must generally advise against the use of douches even when there is hypersecretion, as there may be more danger of injuring the Eustachian tube and ear than of protecting them against the advances of the infection. Steam with the vapor from tincture of benzoin may be of service. A spray of benzoin and resorcin is often efficacious. Heat applied to the sides of the neck near the maxillary angle is of marked service in allaying many of the acute epipharyngeal congestions. Often very satisfactory results can be obtained by applying to the nose anteriorly an ointment of hydrastin muriate gr. 3, menthol and eucalyptol, aa gr. 7, and lanoline oz. 1. Only a small amount of this ointment should be applied at one time and three applications are sufficient for a day. A 10% to 20% solution of argyrol applied to the epipharynx either by the Eustachian syringe or by dropping through the nose has been found to produce very satisfactory results in a large number of these cases. Where these inflammations are accompanied by marked swelling and with extension into the tube and ear and where there is complete blocking of the tube with the resulting middle ear inflammation whether or not there is secretion within the middle ear and bulging of the membrana tympani quick relief of the ear condition can usually

be obtained by injecting a solution of cocaine and adrenaline into the Eustachian tube and following this after a few minutes with an injection of argyrol. In young children or in older children who rebel against treatment we sometimes find it hard to use the Eustachian syringe. In these cases the patient's head can be held in Rose's position and tilted toward the affected ear and the solutions can be dropped through the nose and allowed to flow toward the orifice of the tube. It is much more satisfactory where possible to use the syringe under the guidance of vision. This is true in regard to all treatment of the epipharynx especially when working about the orifice of the Eustachian tube.

Chronic epipharyngeal inflammation may produce a simple hypertrophy with or without purulent secretion or may go on to atrophy of the mucous membrane and to the underlying structures. Except in the after results of severe epipharyngeal diphtheria it is very rare to find an atrophy of the mucous membrane in young children. The chronic inflammations are frequently associated with or due to septic nasal inflammations. In chronic epipharyngeal inflammation even in young children we must never forget syphilis as a possible etiologic factor. Chronic purulent epipharyngitis in young children is often very hard to treat. It is frequently the result of a chronic purulent condition somewhere within the nose which it is impossible to definitely locate.

In all our work within the epipharynx whether for exploration or treatment we must use great care for the mucous membrane of this area, especially that covering the Eustachian tube, will not stand harsh treatment and much injury may follow careless treatment. In cases where it is necessary to remove bands or growths in the lateral fossa or to treat any pathological conditions about the orifice of the Eustachian tube it is possible to proceed with greater precision when the operative field is under vision. This is accomplished when possible by passing an endoscope through the opposite side of the nose and the operative instruments through the same side as the lesion to be attacked. Dr. Yankauer has demonstrated the direct method of attack through his direct speculum. In a recent paper Dr. Beck has described a method of operating upon the epipharynx under direct vision. He passes a rubber tube through both nostrils and then carries the ends through the mouth. By applying traction he lifts the soft palate forward. I have not had sufficient experience with this method to pass judgment upon it, but thus far I have been unable to view the cushion of the tube or the lateral

fossa. In very young children it is frequently impossible to operate upon or treat the epipharynx under vision by the aid of the endoscope. The nasal passages are frequently too small and it is impossible to keep the patient sufficiently still. I am of the opinion this is also true with Dr. Yankauer's tube. I am trying in these cases to pass the curette and forceps by the side of the palate retractor and then use them in the epipharynx under the guidance of the scope passed through the tube of the retractor. As yet I have not developed a sufficiently positive technic to be able to proceed quickly and accurately but I hope and believe it will be possible to accomplish this in time. It is fortunate that in the very young child and in other children who have not been subjected to trauma it is rare that we find adhesions in the fossæ or a demand for surgical treatment for the existing nasal disease.

What we most need at present is more proficiency in examining the epipharynx, especially in children, and more conservatism in treating the pathological conditions found in this space. In order to fulfil these demands it is imperative that we take a wide and comprehensive view of every case before deciding upon the best course to pursue, keeping always in mind that the important object is to prevent aural disease and to relieve as far as possible any existing pathological conditions within the ear.

### THE ETIOLOGY, PATHOLOGY AND TREATMENT OF PHLEBITIS.

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(Continued from the March issue.)

#### MICROSCOPICALLY.

*Acute Phlebitis.* Taking a cross-section of a vein in an acutely inflamed condition we find the following condition: the entire field seems infiltrated with red blood and white blood cells; the endothelial layer of the intima has become very much flattened or stretched, each endothelial cell seeming very thin, this thinness varying in different localities. Beneath this endothelium we find that one bundle of thin muscle fibers is separated from another to a marked degree. The individual small bundles seem to take the stain poorly and there is much brown, granular débris within and between the muscular meshwork. The underlying thin, white fibrous layer does not look so markedly changed except for the infiltration by the blood cells and serum. The media shows the characteristic circular arrangement of the muscular fibers. Oc-

asionally there will be seen a bundle of these fibers singled out as if under high pressure. The circular fibers seem to be thinned out and flat while they are well infiltrated with brown granular material of deep reddish brown tint. In fact this granular material seems very predominant and is of extreme importance because of the dependence for work upon what muscular material there is left. All of the muscular fibers are thin, taking the acid stain poorly and breaking at most dependent connecting points. Here and there we find that the muscular fibers fail to stain to any degree and that atrophy is a marked feature.

The adventitia shows a number of changes very characteristic of this condition. The inner layer of the adventitia shows much granular degeneration of the longitudinal muscle fibers. Fairly well colored dark brown granules are thickly scattered within the muscle itself. The muscle fibers are very thin, taking the acid stain poorly while in places the stain is wanting. Atrophy is a predominating feature and the minute fibers seem stretched to a fine thread. An occasional minute bloodvessel, over-distended, and filled with red blood cells is seen within this muscular coating. This blood within the lumen will show various stages in fully organized clots, semi-organized clots and again quite normal with less crowding by the cellular blood elements and more fluid or serum.

The connective tissue of the adventitia is mostly of white fibrous tissue. In fact the white fibrous tissue is the most predominating factor at this point. There is much infiltration of the fibrous substance, red blood, and white blood cells being plentiful. The various strands of the tissue are separated by this infiltration and much serum gives the whole area a depreciated value. The connective tissue takes a pale green or pearly white color and the individual fibers by a very low refractive power show much weakness. Fine granules are present everywhere.

Now and then we come across a larger or smaller bloodvessel. Some of these vessels are entirely empty, strange as that may seem. On the other hand many of these little vessels are overcrowded with red blood cells. In some of the vessels there are larger or smaller interspaces between the red blood cell impactions, showing serum to be present in plentiful amount. Some of these vessels contain well organized blood clots and here and there are those semi-organized.

Near the periphery of the adventitia will be seen an occasional small nerve ending. These nerve endings contain much granular material and show the

overworked condition in which they are. The nerve substance is cloudy and fails to take a clear stain. This would serve to bear out my hypothesis as to the cause of pain from phlebitis.

On the whole, we find the lumen of all the involved veins very much distended. They are crowded with red blood cells; some having the inter-spaces between the colonized groups of red cells filled with serum. Great numbers of these lumina contain well organized blood clots which take a deep brown or bright reddish brown stain. Now and then we find a semi-organized clot. Under these circumstances, the red cells are much crenated and the white cells very granular, many having lost their nuclei.

Looking over many fields of these veins I find that at times the entire vein wall seems much conglomerated and granular throughout. The acid stain, under these conditions, takes best within the innermost margins of the wall outside of which are found the pale yellow or brown stain encased within a margin of pale pink. Under the 1/6 projective it is at times very hard to find any beginning or end of the vein formation. The veins under such circumstances are simply designated by exclusion in comparison with the surrounding structures. This condition seems to be most constant in those cases where the disease is of long standing or fulminating from the start.

While examining a number of sections made in the long axis of the involved vessels, I found well organized clots of varying lengths completely occluding the vessels and very adherent to the vessel walls. Under dissection for gross specimens to be used in section work, I found these clots in length from one inch to two and a half feet, depending upon the size of the vessel in question. I recall a case where the thrombus completely occluded the tibial, popliteal and femoral veins for their entire length. This followed pneumonia in a little boy with a natural fatal ending. This case is not included in this series of statistics, however, as it occurred since the compilation was completed. Nevertheless it is very interesting and provides a formidable example of what may be possible in the extension of thrombosis.

*Suppurative Phlebitis.* Under this heading we are dealing directly with an infective condition; in other words the condition is one which is very apt to spread more or less rapidly, limited only by the conservative powers of the individual in question. Not only is the vein itself involved but the supporting structures surrounding the vessel are also much infiltrated with pus and lymph. Macroscopically we find all parts much thickened and

necrosis is a prominent factor. Here and there are minute pustules of *greater* or less *capacity*; shreds of lymph adhere to all the surrounding structures and the veins themselves are completely occluded by a mass of pus, blood and lymph. The entire structure is very friable, is easily punctured with a blunt instrument and will not retain sutures and, when cut, leaves material adherent to the knife blade, while studs of lymph and fibrin are plentiful.

Microscopically, a cross-section of this vein shows the mural structures to be more or less indistinct as far as individual layers are concerned. Each layer appears well glued to its neighbor and the walls assume the appearance of a mass of fibrous tissue undergoing necrosis and at the same time are markedly infiltrated with white blood cells and fibrin. The mural layers take the acid stain very poorly, yellow and brownish fields being more abundant but not marked by brilliancy. Everywhere can be found polynuclear leucocytes taking the alkaline



Fig. 8. Femoral vein  $\times 100$  into which culture of *B. Coli communis* has been injected, Guinea pig. Note mural leucocytosis, perivascular hemorrhage and small round cell infiltration of vessel wall. At the free border of the thrombus a suggestion of separation of the intima is seen.

stain unusually well and giving the whole field an appearance of spotted blue. The lumen of the vessel is entirely occluded with a material containing only a few red cells, many white cells and much fibrin. This pus clot is firmly adhered to the periphery of the channel and has a soft appearance. The supporting structures surrounding the vein are undergoing a coagulation- and degenerative-necrosis assuming likeness to death en masse. Many well-stained polynuclear cells are found all through this tissue and shreds of fibrin are very plentiful. Many areas reflect a black unrecognizable mass of dead material. Few of the muscular striations are brought out well while atrophy through the channel of sudden necrosis is most important. Minute collections of pocketed pus cells can be seen every-

where, some of which have burst spontaneously while many others are intact.

*Chronic Phlebitis.* Here we meet the tortuous, calcified, over-distended veins of a long standing ailment. Grossly the veins can be seen beneath the skin, snake-like, winding and unwieldy. To tactile sense they feel like knotted string or rope and at times can be easily rolled beneath the finger ball. Here and there will be felt larger or smaller areas that seem more resistant than the other parts and have a scratchy tendency.

Cutting across a section we find that the knife blade remains practically clean. As pressure is brought to bear upon the blade certain gritty areas will be felt as they are cut through. If these areas are scraped with a knife, a gritty material is freed, which feels like sand when rolled between the finger tips. The venous channels are left gaping and empty, except for an occasional small stringy clot. The elasticity of the vein wall is absent and the ends pout, while the venous walls are thickened to a marked degree. The surrounding, supporting, soft structures are not markedly altered. The muscular and fibrous structures seem to be in good condition so far as a relative value is concerned. These soft structures cut easily and leave a clean knife blade behind.

Microscopically, a cross-section will show the veins to be practically empty. Here and there an occasional vessel is seen partly filled with blood, but this is not common. One very noticeable thing is the absence of intima reduplication acting as valves for column support. In nearly all of the specimens examined this was so. The endothelium of this intima was very flat, shining and glistening, and in many of the sections examined, there were seen larger or smaller areas taking the pale stain of calcified tissue. However, numbers of the section showed none of this calcified deposit. The lumen of all the veins seemed large as if it had been over-capacitated for some time. The basement structure of the intima was thin and did not take either stain well. The media showed in many sections a tendency toward increase in muscle fiber elements. Again there would be fields where the muscle bundles were small, taking the acid stain poorly and showing evidence of atrophy. Calcified areas were found deposited in the muscle bundles of many fields. This, however, was not a constant factor, and in many instances it was wanting. The adventitia of many fields appeared normal and took the stain fairly well. The scant muscle bundles were absent in many instances where they might be expected to be found. Other sections showed the

white fibrous structure to be overdeveloped or hyperplastic. Again we found that this fibrous structure was very much thinned and took the stain very slowly. This portion of the venous structure was not by any means free from calcified areas. The supporting, soft structures did not vary greatly from the normal except for patches of calcarious deposit. These parts stained well and seemed fairly healthy.

Longitudinal sections from the same specimens showed very tortuous courses in the veins. They would appear and disappear alternately for some distance. One thing was prominent in the longitudinal section work, namely, the presence of more blood in the veins. Small clots were seen here and there although they did not always over distend the vessel.

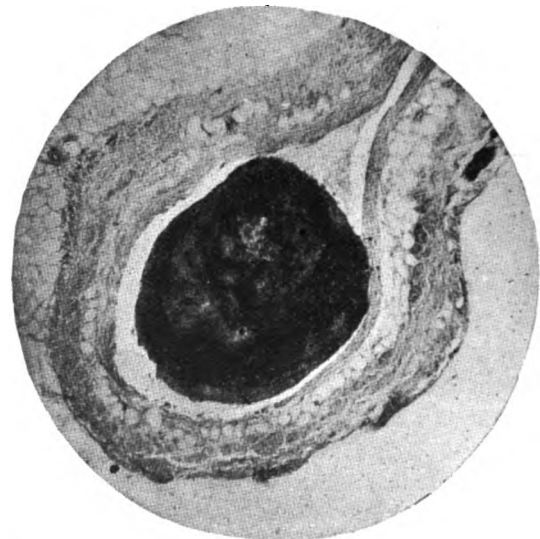


Fig. 9. Phlebolith of vesical plexus. Note absence of intima, the density of the coagulum and the vacuoles in the media.  $\times 60$ .

#### TREATMENT.

In treating phlebitis cases certain general rules can be carried out in every instance and again other things have to be considered according to the location and the part involved. We must also consider the individual himself. For the present we shall consider only the acute forms of phlebitis and their treatment will be covered under the three headings just outlined.

All phlebitis cases, so far as treatment is concerned, can be summed up in the word, "rest," and following such, the result, in most instances will be, "repair," permanent or temporary. General hygienic rules should be adhered to very closely in every case. Here, as with any other pathological condition, fresh air, proper care of the skin by bathing, body cleanliness throughout, protection from exposure, proper bed and body clothing, sun-

light and suggestive influence resulting in established confidence, all play their important parts.

A feeling of well being should be encouraged at all times. All phlebitis cases are slow in recovering and to keep the general mental tone high is to encourage more rapid recovery. The entire body should be bathed daily with alcohol and water supplemented with a soap-suds cleansing twice a week. Following such a bath the skin should be well frictionized, thus increasing the superficial circulation and drawing away from the point of disease as much as possible. One rule is always to be applied, *i. e.*, never frictionize over the area of disease but draw the blood elsewhere thus allowing the diseased area to remain at rest.

The bed clothing should be light but warm. This class of cases seems to do better in linen sheets with light all-wool blankets for the top covering. Any discomfort from heavy clothing weighing down upon the diseased area, should be avoided. The diseased part can be protected by a cradle or other improvised frame for holding up the bed clothing. Flannel night dresses serve best to come next to the skin. If any underclothing is worn in bed (it is far better not to wear any), it should be of the silk-wool variety with very fine texture.

Heliotherapy plays an important rôle in this disease. If possible, expose the involved part to the direct sunlight for at least one hour daily. All cases seem to have a shortened convalescence by following out this rule. In fact, if the patient could recline in a solarium during all of the day the entire system would benefit much by the exposure. In addition, the part for special attention could be exposed by removing the covering for the one hour needed during the period of maximum sunshine. Patients will do better in a well ventilated room by themselves than in a ward. The room temperature should never be above 65°, and free circulation should be established.

The alimentary tract should be very closely watched in order that the bowels may move twice in each twenty-four hours. If they will not do so naturally, a mild cathartic should be given. Three times a week a high enema should be given that the entire intestinal tract may remain clean. Of course, where local intestinal trouble is present, as in typhoid fever, or in cases where for other well-founded reasons such disturbance is bad, this procedure should be omitted. In general, however, this rule for cleansing should be followed. Plain suds and water, two quarts in amount, never forced, seems to do the work best. Under no circumstances should the bowels be allowed to become constipated.

The diet should be carefully supervised from day to day. In typhoid cases this needs special care, as also when other abdominal viscera are involved. Whenever the veins of a serous cavity are involved, especially when that cavity is the abdominal, the closest care, as to diet, should be taken. In those not suppurative, the nourishment should be liquid and that well selected. The broths and soups should be strained, the fruit juices should not contain any pulp, the milk should be diluted with water and the proper amount of lime water added. Thus it will be seen that only a liquid diet is permissible. The heavier and full strength liquids are not easily digested. Any nourishment forming large curds in the stomach should be excluded. Water should be given very freely and the patient should be encouraged, coaxed or even gently forced, to take more than the amount to which he is accustomed.

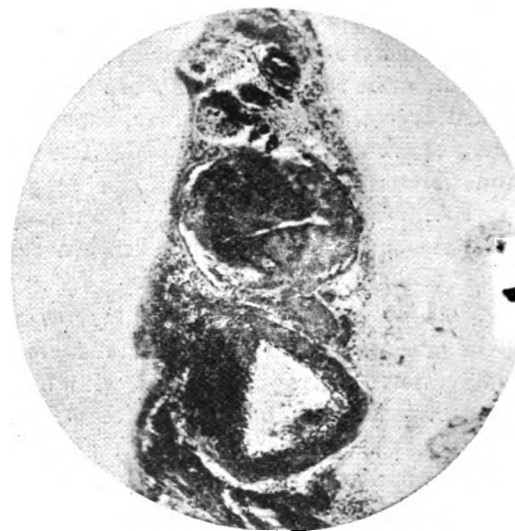


Fig. 10. Vessels of groin of Guinea pig into which alcohol has been injected. There is thrombus of the femoral and smaller veins. The artery as usual escapes.

When suppuration is present as a complication of the venous condition within a serous cavity, far better results are obtained if the patient be Ochsnerized. Everything except water is withheld for intervals varying from three days to a week. This rule should be closely adhered to, if the best results are to be obtained. In all internal suppurative conditions the general system is undergoing a continuous shock, so that any extra burden in the form of food does more harm than good and merely adds to the work of the functions already overtaxed.

After the critical points are passed and reactionary resistance comes forward, we can begin to give nourishment. Only the most easily cared for liquids should be given at first; as malted milk, albumen water, orangeade, grapefruitade, lemonade and plenty of water. Guided by the care the patients

take of this amount of nourishment, it should be gradually increased to a full liquid diet. I have found that egg-nogs, raw eggs and malted milk egg-nogs serve to aid in these cases at this time.

Gradually a semi-solid diet is begun while the milk, eggs, egg-nogs, plain and with malted milk are continued. If this diet is well received the full house diet can be given and from this moment on rapid advances toward recovery are made. Each case should have his individual immunity well established before forced feeding is commenced.

The general systemic treatment can be classified under two heads; namely, superficial and deep.

#### SUPERFICIAL TREATMENT.

Under this heading the acute and chronic phlebitis cases are to be considered.

*Acute Cases.*—Here we have to consider a condition very prone to extension, more or less rapid and at times extremely liable to thrombosis. Two things we desire to accomplish, one being limitation of the disease, the other prevention of occlusion of the vein or veins involved. To accomplish these ends the part should be kept elevated.

Let us take as an illustration the involvement of the veins of the lower extremity. The limb should be elevated upon a well padded inclined plane at an angle of forty-five degrees. By so doing the blood is allowed to drain back into the larger channels and thus prevent extreme stasis, and thrombosis is far less apt to occur. Swelling is kept at a minimum and the skin maintains good nourishment, elasticity and tone. The member should be carefully wrapped in sheet wadding or absorbent cotton held in place by very light gauze bandaging. The limb is then placed in a comfortable pillow cradle resting upon the inclined plane while a good position should be maintained by keeping the toes up, the foot held at right angles to the limb and the heel supported so that no extra pressure will come upon it. Under no circumstances should the part be massaged, and rough handling and jerky movements should be avoided. It is a good plan to bathe the skin with an alcoholic solution, using a soft sponge and avoiding rubbing. Dry the skin by fanning and then dust with talcum powder. Occasionally the powder can be omitted and olive oil used to gently bathe the skin surface. The whole dressing should be continuously heated by hot water bottles so adjusted as to bear no weight upon the part. The temperature of the dressing should be evenly maintained at 110° to 115°, day and night. Once each twenty-four hours all the dressing should be carefully removed and the member inspected.

Now and then we meet a case where ulceration of the skin has occurred over the site of the involved vein. This is brought about in two ways, either by rupture of the vein, or ischemia. In either case hot bichloride of mercury fomentations should be applied and these should be changed frequently in order to be kept moist and hot, preventing adherence of the gauze mesh to the raw area. A week of this treatment will so antisepticize the area that the fomentations can be omitted, the area allowed to dessicate and a dry dusting powder applied. When treating these cases the warm covering should not be disturbed. On the contrary, it should be windowed over the special area to be treated so that ready access to the ulcerated part is obtainable while the dry dressing as a whole is not disturbed. After the dusting powder treatment is begun the ulcerated area should be daily cleansed with subli-



Fig. 11. The result of puncture of mesenteric vessel with hot needle. Note the firm, hard thrombus continuous with a perivascular clot and the fact that it is not adherent to the intima.

mate solution, allowed to dry by the influence of the air, and then redusted. The dusting powders giving the best results are oxide of zinc, stearate of zinc (carefully pulverized and not allowed to cake), subgallate of bismuth, and the like. We all have our choice of dusting powders and they each seem to serve their purpose well. Fortunately, ulceration in the acute forms is not frequent.

*Chronic Cases.* Under this head we meet the ambulatory type of cases found in those who do hard labor, requiring much standing. Ordinarily these cases must be treated as office patients and they have to keep on working in order to continue to support their families. Thus we are confronted with a condition which requires careful supervision and explicit, detailed directions. We are dealing with the large, tortuous, superficial veins stagnated by overdistention and lacking proper support.



First of all, we must test the ability of these veins to empty themselves. This is done by having the patient lie down, elevate the lower limb or arm, as the case may be, and by careful digital milking endeavor to empty the tortuous channel. If this procedure succeeds, the case seems more likely to be amenable to a trial without operative procedure, for the time being at least. The patient is then instructed to elevate the disrobed member at an angle of  $45^\circ$  for from ten to thirty minutes daily. He can do this during or following a meal, thus not intruding upon his working hours. A properly outlined or close fitting elastic or linen fiber stocking is to be worn continuously while at work. Whenever the limb be elevated for rest and drainage this stocking should be removed.

The patient should be thoroughly instructed as to the proper care of the skin, which should be bathed thrice daily with an alcoholic solution without using the skin roughly. A soft sponge should be used for this purpose and the skin surface stroked in the direction of the venous flow. After bathing, the skin should be dried by fanning and talcum powder is to be dusted over it. We should always caution the patient against undue roughness and that special care should be taken not to engage in scuffling or lifting heavy weights.

The patient should improvise an inclined plane cradle, properly padded, in which the affected member may rest during the night. Often elevating the foot of the bed eighteen inches will serve the purpose very well; in order to counteract discomfort of the upper body the upper half of the mattress can be propped up with padding or an extra pillow or two provided. In this way the part will be put at complete rest during the sleeping hours and pain, fulness and itching are largely prevented from developing. The stocking should always be removed during sleep, to be reapplied, after properly bathing the part, the first thing in the morning. The patient should be made to understand that this is very important.

When a desirable change of occupation can be made without lowering the income of the patient such a change should be advised. Often such a change as that as will provide the rest portion is beneficial even though the physical labor be quite as hard.

Chronic phlebitis cases are materially benefited by local alternate hot and cold spray, douching, packs or submersions. One of these four methods can be used according to the conveniences of the patient, for they give like results. The submersion and spray combined are often the most convenient and are to be carried out as follows.

Two tubs or pails are used, each containing enough water so that when the affected extremity is submerged, it will cover, if possible, the entire field of tortuous veins. One pail contains water drawn from the cold water tap (or if it be in hot weather a piece of ice should be added in order that the water may be very cold); the other pail contains water at a temperature of  $110^\circ$ . The affected member is first submerged in the hot water and held there thirty seconds. It is then submerged in the cold water for fifteen seconds. This alternating procedure is gone through ten times, ending with the cold water submersion. The part is then gently rubbed until the skin is dry and red, showing proper reaction. Gentle stroke massage in the direction of venous flow is carried out for ten minutes, the skin is dusted with talcum powder and the



Fig. 12. Preparation from case of thrombosis occurring during hernia operation. There is a dense perivascular coagulum and a thrombus is firmly adherent to the intima of the vessel. It is somewhat contracted, due to the reagents used in preparing the section.

member is properly clothed after the elastic support is applied.

Where it is not feasible to use the submersion method, spraying with sponges of hot and cold water, or a nozzle spray attachment serves the purpose very well and is applied for the same length of time. In fact, even when the submersion method is used the spray is often employed to supplement it by treating the upper parts or fields that cannot be submerged.

When none of these methods can be carried out the hot and cold packs for the same periods serve well. Heavy turkish towels are used, wrung out in water of alternating extreme temperatures. The main purpose is to obtain an alternate application of heat and cold extremes for the desired length of time. By such treatment the vasomotor nervous system and sympathetic bloodvessel innervation sys-

tem are greatly augmented so that the musculature of the venous walls are stimulated to action.

It is always wise to caution the patient to dry the skin by gently rubbing in the direction of the venous flow. The tactile and gentle palm pressure stroke following the skin drying should be carried out in the same way. The powder should be gently rubbed into the skin in a like manner after dusting it over the part. The elastic support should then be immediately applied. This régime should be carried out twice daily over a period of say three months.

One other thing to be gained by the alternate thermic applications and elastic support, is to make the deeper venous channels able to care for the superficial congestion. As a result we are better able to recommend the degree of relief which is to be obtained from any surgical procedure that might be advised. If the tortuous superficial veins are emptied to a greater or less degree by this procedure we are fully justified in advising operative methods for complete relief. It is certain that chronic phlebitis cases are aided to a greater degree by operative measures instituted at the proper time. This phase of the subject will be entered into more completely later on.

Chronic phlebitis or varicosity of the abdominal wall or other parts of the body aside from the extremities is best treated so far as alternating thermic reactionary applications are concerned by the spray or packs. The actual nozzle spray serves the best and, in fact, it is very satisfactory in all of these cases. I have used all four of these methods to great advantage in this class of cases.

As has been mentioned before, proper dress for the part is very important and the necessity of properly fitting shoes, sleeves, gloves, socks, etc., should be fully explained. Any of the everyday dress fixtures should be properly fitted and made of good, non-heat conducting material. Rubber heels on the shoes, for instance, will often give much relief in involvement of the lower extremities. Shoes of soft kid, not tightly laced, or corsets properly fitted, are also to be advised, as indicated, so that even pressure is brought to bear upon all surfaces. In fact, the high grade abdominal belts will aid much in giving relief to this portion of the body. Great care should be executed in adjusting such an apparatus, and the corsets should be displaced by such an invention when possible.

When the abdominal wall veins are involved, posture during ten-minute intervals thrice daily aids greatly. This can be done while the alternating thermic reactionary treatment is being applied with

the patient lying flat on the back and the hips slightly elevated, supported on a pillow. In these cases the skin should be dried by gently rubbing up on the right side of the abdomen, across the top just below the ribs, down on the left side and then in a circle with the umbilicus as a center. The digital and gentle palm pressure stroke should be carried out in like manner.

One other class of cases might be mentioned under this head, namely, involvement of the hemorrhoidal veins resulting in the condition popularly called piles. This is nothing more or less than phlebitis, in chronic form, of the hemorrhoidal veins. To alleviate this condition general applications of ointments, liquids, medicated enemas, etc., may be tried, but I believe that surgical intervention remains the only true solution to the situation. By

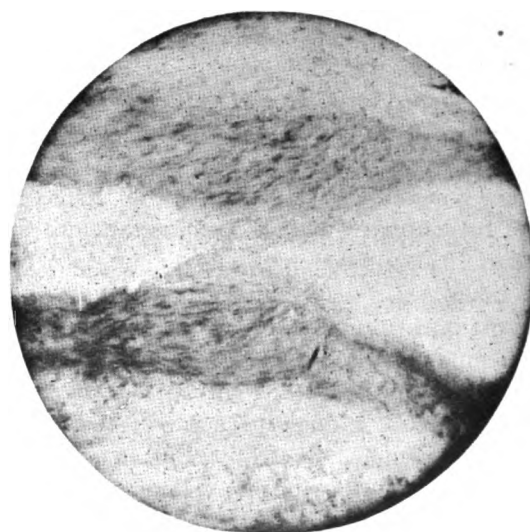


Fig. 13. Femoral vein of dog  $\times 100$  to which pressure has been applied with forceps. Three days later the animal was killed, and the preparation shows thickening of the intima and the beginning of adhesions. There is no deposit of corpuscles or diapedesis.

surgical measures properly carried out we obtain permanent relief to the satisfaction of the patient.

#### DEEP TREATMENT.

Under this head comes the treatment of those cases where the large veins of the broad ligament, the portal system and accessory mesenteric veins, hepatic vein, etc., are involved, the veins draining the viscera of serous cavities. These conditions are most often the result of septic infection or auto-intoxication if we leave out of consideration those that are the result of cardiac insufficiency or hepatic cirrhosis. In these cases we are treating a condition that calls for absolute rest under the most favorable circumstances. The patient should be kept very quiet in bed, in a room where fresh air and sunshine are plentiful. The bowels must never be allowed to become constipated in the slightest degree.

If the case be one of acute septic infection or auto-intoxication, the diet should be restricted to a marked degree; in fact, I believe that Ochsnerizing these cases gives best results, giving nothing but water in large amounts, hot or cold as desired. This should be followed out for from four days to a week. If the broad ligament veins are involved Fowler's position is to be used, the patient lying flat upon the mattress with the head of the bed elevated for eighteen inches. The foot-board should be placed so that the patient can rest comfortably with the feet against something soft, as a pillow. It is best to keep the patient flat upon her back and caution her not to move much; also the nurse should be especially cautioned not to allow the patient to move hurriedly and that she should not handle the patient except with much care. A cradle should support the bed clothing, thus preventing any undue pressure upon the abdominal wall. Ice caps should be applied over the lower abdomen if the skin surface is protected by some soft material, as a turkish towel, which will act as a pleasant intermediary beneath the cold application. As long as the temperature remains above  $100^{\circ}$  these cold applications should be continued, but whenever the temperature is above  $102^{\circ}$ , a fever bath should be given every three hours.

I insist on two or three things in particular when these temperature baths are given; namely, all the water, containing the proper proportion of alcohol, should be at  $95^{\circ}$ , a single part should be bathed or sponged separately, that is one arm should be bathed, rubbed dry and then frictioned with the palms of the hand; all rubbing and frictioning should be done upward toward the body. After this arm is properly cared for the opposite arm should be treated in the same way and covered. Before another part is bathed, the part just treated should always be covered. Next the face neck and shoulders are bathed in the same manner. Next in order, come the chest, upper back, lower back and abdomen. The back should be rubbed up and down and across between the scapulae. The abdomen should be rubbed very gently in a circular motion, right to left, with the umbilicus as a center, or if it be too tender not bathed at all. Next in order come the lower extremities, which are bathed separately. After the bathing each part, in the order named, should be carefully frictioned with the palms of the hands. This is most important as the superficial circulation becomes increased and the skin flushed. I believe that this increase of superficial circulation has much to do with cooling the body interior by radiation of heat from the body surface. I also believe this lowers the temperature

quite as much as the cold bathing and the treatment would not be complete without this increase of superficial circulation. The temperature should be recorded just before and immediately after the bath.

At the end of four days to a week, as the temperature gets to  $100^{\circ}$  or lower, feeding should be begun, first by giving limited liquids, then gradually increasing in the usual manner. A daily high suds enema should be given throughout the course of the disease and the alimentary tract is to be kept clean. The twenty-four hour amount of urine excreted should be kept and a uranalysis made daily. The patient's bed should never be put down on a level until the temperature has been normal for three days.

Vaginal douches of bichloride of mercury (1-2000) at a temperature of  $110^{\circ}$ , if given twice daily, aid much in alleviating this condition, and no one thing does more good in phlebitis of the broad ligament. These douches should be continued for one week after the temperature has come down to the normal line and remained there.

Whenever there is membrane left in utero this should be removed with a dull curette while a sharp curette should never be used under any circumstances. After the curettage, a hot intrauterine douche of sterile water (temperature  $115^{\circ}$ ) should be given. Occasionally a boric acid solution may be used, but sterile water serves the purpose quite as well. The intrauterine douche should not be repeated unless there be further evidence of continued absorption. Where such is evident it should be given once daily for a week or so. Convalescence should be very slowly progressive with the patient remaining in bed for three weeks after the temperature has fallen to normal. Slow advancement is to be insisted upon.

When hepatic cirrhosis is the active principle behind the involvement of the veins in the upper abdomen, the usual procedure is gone through for this condition; namely, absolute rest, free diuresis, and diaphoresis, and perfect elimination. Hot packs for thirty minutes twice daily give wonderful results in these conditions. Withdrawal of any of the active etiological factors, such as alcohol, must be insisted upon.

If the heart be at fault and broken compensation be present, the usual cardiac treatment for this condition is to be given; namely, posture, perfect elimination, hot packs and stimulation by the old, well-grounded methods.

None of these acute cases should be allowed to get up too early, but should be kept in bed and a slow and carefully supervised progress should be

insisted upon. Hygiene, diet and advice play their part very strongly under these circumstances. The services of a well-trained and properly fitted nurse should be obtained whenever possible.

#### MEDICATION.

Internal medication in cases of phlebectasis should always be given for a definite reason based upon sound judgment. On the whole, other therapeutics than drugs seem to give most satisfaction, yet agencies given internally help to a certain degree. If one were to choose between giving up the internal medication or the external treatment, most of us would drop the drugs.

However that may be, certain supports to the general circulation are needed in all cases at certain stages. In the acute cases strychnine, digitalin, tincture of digitalis, whiskey and brandy as cardiac and circulatory stimulants and augmentors are contraindicated in the early stages.

The fewer drugs given internally the better unless absolutely indicated by some variation in the heart action. After the immediate danger of rupture of a bloodvessel, hemorrhage, embolism, etc., are passed, in from seven to ten days, these circulatory augmentors are needed.

Strychnine given in 1/30 gr. doses is the standby for steady support. Brandy and whiskey given in varied, tolerated doses at regular intervals are helpful, while tincture of digitalis or digitalin are occasionally needed. The tincture should not be given in doses over ten minims three or four times a day and the stomach should always be watched for any irritation from this drug. Digitalin, gr.  $\frac{1}{4}$  (Merck), every four hours during the day and if needed at night serves well in many urgent cases. The strychnine and digitalin should be given hypodermatically if indicated by any irritation of the gastric mucosa.

I believe that atropine and nitroglycerine are contraindicated in all cases as no extreme influence long continued, should be brought to bear upon the vasomotor innervation of the vessels, since the fleeting influences intermittent in reaction serve best.

In the cases where affection of the heart or liver is the direct cause diuretics should be given. Potassium citrate, gr. X, well diluted in water, given every four hours, seems to stimulate the kidney cells to free function and is a good drug to use under such circumstances. Tincture of digitalis, assayed and physiologically tested, acts well in this capacity and also regulates the heart rhythm and pulse volume. Pure cold water is possibly our best diuretic after all.

In the chronic phlebitis cases strychnine gr. 1/30

or tincture of nux vomica in ten minim doses four times a day, is nearly always indicated. Thus the venous sluggishness is prevented to a great degree. This class of cases requires systemic tonics in the form of Basham's mixture, Bland's mass, one or two of the bitter tinctures, as gentian, cinchona or colombo taken well diluted with water a half hour before meals, or, in fact, any of the numerous popular general tonics are indicated during the entire course of treatment. By these the system is kept bolstered up and the appetite remains keen for the proper sort of nourishment. Arsenic in one of its forms seems to do good. Fowler's solution given in two minim doses, well diluted in water, three times a day before meals and increased a minim a day until ten minims three times a day are given, is good routine. Arsenous acid, gr. 1/50, three times a day, in good mixture, serves well. I rely much upon arsenic as a general systemic tonic in these cases.

In the acute cases during convalescence the systemic tonics just mentioned, are indicated. The patient should be built up to the full vigor of health and continue the medication, to a limited degree, for some time, possibly three months. For the bowels the cathartic best tolerated is the one to use.

Other drugs than those mentioned seem superfluous. It is useless to overload the system with medicine and only one or two, or at the most three of these drugs, need be given over any one period of time. Generally one or two drugs given under proper guidance will do quite as well. A good rule to follow is not to give any except those that are indicated. The field of usefulness of potassium iodide is very limited except in the syphilitic cases. In these cases it does serve well, given alternately with some form of mercury. Salvarsan has seemed to do good in a limited number of cases of luetic origin. We can not promise too much from its use, however.

#### OPERATIVE TREATMENT.

*Acute Cases.* Surgical intervention is very limited in its field of usefulness in this class of cases. As a rule it is very wrong to interfere surgically. However, in cases of suppurative phlebitis, when definite abscess formation is present, to drain the field about the vein does good. When such a method is instituted the drainage should be continued for a long time, in fact until the bottom of the drained field is absolutely dry and free from pus, and granulations are healthy, bleeding and active.

In my opinion the hepatic cirrhotic cases are not greatly benefited by the operation, to short cut the

circulation by attaching the mesentery to the anterior abdominal wall by intermediate method. This may have succeeded in the hands of some operators, yet so far as phlebectasis is concerned its field of usefulness is narrow.

Occasionally gall-bladder disease, inflammation of the bile ducts or acute pancreatitis, will bring on a limited phlebectasis about the source of trouble. This condition does demand surgical intervention. Drainage of the gall-bladder, ducts or both, is indicated and should be performed under such circumstances.

*Chronic Cases.* Under this heading the superficially involved cases are the ones that derive most benefit from surgical intervention. It is in those cases that have markedly tortuous veins of the abdominal wall, lower extremities, etc., that yield satisfactorily to surgical procedure. The abdominal wall phlebitis is best treated by the intermittent ligation and partial resection operation. Here and there the veins are cut down upon and ligated. This is done at various points over the entire field, the incisions being long enough to produce a fair scar. The contraction of the scar tissue aids much in giving satisfactory results. Occasionally the vein itself is completely resected for a distance of from two to four inches. Giving time for proper healing following this operation, the results are generally good. It is often wise to have the patient wear a properly fitting belt for some time following convalescence.

Tortuous veins involving the lower extremities are best treated by the internal stripping method. This operation, described below, I devised from the idea suggested by the Mayo external stripping operation. I have used this technic with satisfaction in a number of cases for the past few years.

#### OPERATIVE TECHNIC.

In the surgical treatment of varicosity the technic that is best systematized will yield the most pleasing results. To be sure, this is true in all fields of surgery, yet too much care can not be taken when stripping a vein.

First, perfect asepsis is essential at all times.

Second, the point of incision should be carefully selected. In stripping the long saphenous vein four skin incisions are generally needed. The four points selected for these incisions are: (1) about one inch below the saphenous opening on the anterior, internal surface of the thigh; (2) about one inch above the internal condyle of the femur on the internal, anterior surface of the knee; (3) one inch below the head of the tibia on the internal sur-

face of the leg; (4) two inches above the internal malleolus on the internal, anterior surface of the leg. If it be remembered that the long saphenous vein can be easily found beneath a line drawn in such a way as to equally divide the internal surface of the thigh and leg, it will never be hard to locate this vein. The only deviations are where it arches outward just below the saphenous opening and posteriorly at the knee, as it passes behind the internal condyle.

Third, the separate incisions need never be more than two inches in length, while in depth they need but pass through the integument.

Fourth, the vein is best stripped by the internal or lumen method, thus leaving the adjacent nerves intact.

*Author's Description of Modified Instrument, With Technic of Its Use.* The instrument (fig. 7) is about two feet in length and easily bent to accommodate all conditions. *A* represents the shoulder about which the vein is tied. That part of the instrument between *A* and *B* remains outside the lumen of the vein. *C* represents that portion of the instrument which enters the vein first. It is also the point wherefrom to exert traction.

A No. 4 copper wire two feet in length is selected. At one end this wire is looped in such a manner as to produce a somewhat prominent shoulder. (See illustration.) This wire can easily be bent to fit all curves and accommodate circumstances. If desired, a properly plated instrument can be obtained from instrument dealers. The incision below the saphenous opening and that just above the internal condyle are made, the vein dissected out at these points, and raised, for convenience, by passing a director beneath it.

A No. 2 chromic catgut ligature is then used to tie off the vein at these two points. A minute longitudinal incision is then made in the wall of the vein exposed through the upper incision and the unlooped end of the wire passed through the upper incision, down through the lumen of the vein to the lower skin incision. Here another minute incision is made in the venous wall through which the wire is allowed to emerge. This wire is drawn down through the vein until the shoulder of the loop just enters the lumen at the upper incision, while the loop itself is not drawn into the vein. A No. 2 chromic catgut suture is then made to encircle the vein at the upper incision and tied tightly about the shoulder of the loop. All free catgut is then cut close to the knots and the vein is cut loose at the point of both incisions, leaving it free between them. The lower end of the wire is then grasped

and by gentle, steady traction the upper division of the vein is stripped away.

By this method the vein is not turned wrong-side out during the stripping, but, rather, the shoulder of the loop causes it to double upon itself, and as a result the vein is not torn or injured in the slightest. The stripping should always be done from above downwards, as all tributaries enter the saphenous vein at an acute angle with the apex pointing the way the stream flows. Thus when traction is made downward these tributaries are separated from the main vein at an angle opposite the direction of the blood stream. In this way these tributaries are occluded and subcutaneous hemorrhage is prevented. After the vein has been stripped it can be uncurled from the loop and examined to insure complete removal. The catgut ligatures should be left long and anchored until the occluded portion of the vein has been stripped, when they can be cut and the raw ends allowed to retract.

After the upper division of the saphenous vein has been treated, the portion below the knee is stripped in the same manner from above downward. The little free blood which may have escaped into the tract is gently squeezed out and the incision is closed with silkworm gut. No drainage is needed. The skin is cleaned, the wound covered with gauze and a fairly snug bandage applied, extending from the foot to the hip.

*Post-operative Observations.* Very little pain is experienced if the limb is allowed to rest gently upon an inclined plane. A cradle supports the bed clothing and the part is put at complete rest. Two dressings are made during the first eight days and the silkworm gut stitches are removed at the end of this time. The limb is kept well elevated for three weeks. After this period the part is brought into use very gradually.

When the patient begins to walk he should be instructed to move slowly and to rest often. When resting the limb should be kept elevated.

At the end of four weeks, massage is instituted, the limb being rubbed upward for its full length, twice daily. This treatment is continued for two months, during which time strychnine is given in the usual dose and general hygienic and tonic principles are instituted. Swelling rarely occurs if these instructions are carefully followed. The patient can return to his usual vocation in four weeks.

*The advantages of the method* are sixfold:

1. The nerve which accompanies the vein is not irritated, and thus there is no post-operative pain.
2. There is very little hemorrhage.
3. By using the wire loop and shoulder the vein

curls upon a space of one and one-half inches. There is no danger of tearing the vein; the tributaries are occluded when separation occurs; and all bungling work is eliminated. The vein can be uncurled from the loop and carefully examined.

4. The tributaries are torn away at an angle to the main channel, crushing the separated raw ends and leaving them fairly well ligated by this traumatism.

5. In stripping the vein by this method the tributaries are torn and not cut. The extra incisions at times needed in other methods are not called for here, and there is no hunting for the broken end of the main vein.

6. The small incisions leave very little scars after a proper length of time.

For the microphotographs in this article I am indebted to my friend, Dr. N. S. Chapman, who has prepared them for me in connection with his experimental work for the Fiske Fund Essay No. LV.

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#### MESSAGE IN FRACTURES.

Every medical man who undertakes the treatment of fractures, dislocations and kindred injuries is now expected to understand when massage is required and be ready to apply it personally without grudging the time exacted.—J. J. CLARKE in the *Universal Medical Record*.

#### CHRONIC PROSTATITIS.

In forty-six cases of chronic prostatitis of gonococcal origin the gonococcus was isolated but five times and was seen on stained slides but nine times. From a public health standpoint such cases are of the greatest importance. It has been demonstrated many times that the accessory bacteria may be present in such abundance that although gonococci are present they are demonstrable only by repeated examination and by special methods. Unless the examination has been made at least three times and at least once by the provocative method no case of chronic prostatitis or posterior urethritis should be released as non-infectious.—A. P. HITCHENS and C. P. BROWN in the *American Journal of Public Health*.



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**WALTER M. BRICKNER, M.D., Editor**

NEW YORK, APRIL, 1914.

## RECURRENCE OF SYMPTOMS AFTER OPERATIONS FOR PYLORIC ULCERS.

The operative treatment of pyloric and duodenal ulcers forms a brilliant but by no means finished chapter in medical progress. (We say "medical" for the internist has contributed to it no less enthusiastically than the surgeon.) The indications for operation are fairly generally established, and concerning the type of operation to be applied there is considerable and increasing accord, but by no means unanimity. In the secondary, but also very important aspects of the operation there is very much that is still unsettled. Leaving out of consideration, for the time being, the location and method of performing a gastro-jejunal anastomosis, the indications for, and value of the procedures of excising and "infolding" an ulcer, are, we think, still quite unestablished.

It is striking to observe that in many cases gastro-jejunosomy gives immediate relief of the distressing pains and discomforts of a pyloric or duodenal ulcer, even before the patient resumes eating, a relief perhaps afforded by the mixture of the alkaline intestinal secretions with the acid gastric juice, although this simple explanation has not been proven. That the relief does not always continue indefinitely, that often all the ulcer symptoms return after a greater or shorter period following a well-performed gastro-enterostomy, has stimulated a study of the factors that underly the failure of this procedure to cure all cases.

Applying to ulcer of the pylorus and duodenum the same principles that govern the treatment of analogous intestinal lesions, it has been fairly accepted that the mere establishment of another gateway for the food is not, in itself regularly sufficient to entirely sidetrack that food from its normal outlet; and that, therefore, something more must be done to shut off the ulcer from the food track. To accomplish this, von Eiselsberg added to the gastro-jejunosomy the device of unilateral exclusion by cutting through the pylorus and closing both ends with sutures. This is a rational, elegant and altogether surgical procedure, but in the often emaciated, hemorrhage-weakened patient, the added shock of manipulation and the increased time of narcosis which it entails, decidedly increase the operative risk. Berg, of New York, was, we believe, the first to employ the much simpler expedient of applying a stout silk puckering suture about the pyloric region, proximal to the ulcer, tight enough to close the channel, but not tight enough to cause necrosis. Lambotte has employed a twine ligature in a similar fashion. Various surgeons, however, assert that silk and twine ligatures, and the silver wire constrictor employed by Fowler, eventually ulcerate into the stomach and the opening becomes re-established. Whether this is an inherent objection to foreign substances thus employed, or whether such an outcome proceeds from faulty technic in their application, we do not know. Berg has been satisfied with his results, and he has demonstrated the silk thread in place, and the pylorus well-blocked, long after the operation. To escape from the use of a foreign-body constrictor, Wilms recently introduced the employment of a strip cut from the sheath of the rectus abdominis, tied twice around the pylorus. Charles Mayo has also employed a strip of tissue, which, however, he takes from the gastro-hepatic or greater omentum, leaving it still attached at its gastric end, and further diminishing in size the site of blocking "by the application of several interrupted sutures of fine silk to take the strain during the healing process."\* Whether living tissue, thus used, possesses more than a theoretical advantage over the silk thread, it is too early to assert.

That the practice of "pyloric exclusion" has greatly reduced the number of recurrences it is now safe to say. But the statement that has been made, that gastro-enterostomy will *always* fail to cure pyloric or duodenal ulcer if the outlet is not pathologically or artificially occluded, is not substantiated by clinical observation nor bismuth-*x*-ray studies. Nor is it true, as has also been claimed, that a gastro-

jejunostomy will always eventually close if the pylorus is not blocked.

Granting, however (for exceptional cases do not disprove its rationale), the importance of pyloric exclusion (by whatever method experience establishes as best), as a part of the operation for pyloric and duodenal ulcer, several questions remain to be answered:

*Is it wise to apply artificial exclusion only to those cases for which it has been recommended, viz., those in which the pyloric outlet is not already pathologically occluded? In some of the cases in which there is obstruction by an ulcer mass does not the gastro-enterostomy allow the mass to shrink sufficiently to reopen the pyloric outlet, and thus revive the ulcer irritation? It seems reasonable to assume such a "vicious circle."*

*Even though the food be side-tracked and the pylorus blocked, how much are reduced the peristaltic contractions at the ulcer site, how regularly is spasm obviated?*

*How often may an ulcer left in situ, albeit side-tracked and occluded, continue to give symptoms by reason of its very presence? How often may such ulcers refuse to heal?*

We can probably better answer these questions when there has been discovered the etiology of these ulcers, which also may revolutionize their treatment.

It must be remembered, of course, that the cause of the recurrence of gastric symptoms after ulcer operations, does not always lie at the ulcer site. It arises also, sometimes, from a variety of mechanical faults following gastro-enterostomy, but far less frequently than in the days when that operation was a complicated procedure elaborated to avoid the dreaded "vicious circle."

Some time ago Wm. Mayo called attention to the development of a gastro-jejunal ulcer at the site of anastomosis, and in a recent article\* he again records it, and some related local faults, as the occasional causes of "recurrences" in these cases. He attributes these ulcers to irritation by a silk suture which may remain hanging in the wound for a very long time. He therefore advises "that very fine silk, not heavier than 0, should be used for gastro-jejunosomy, that the bite of the sutures should be as near the margin of the incision as possible and that, if it is necessary to reinforce a weak suture line, interrupted fine silk sutures are advisable or such sutures used for part or the whole of the outer row. It has been our practice for a long time to use catgut for the inner row, but it is not the inner row that gives trouble. It is the outer or musculo-peritoneal suture, and I have no doubt that

if the order were reversed, using silk or linen for the inner row and catgut for the outer, better results would follow. However, catgut is so good a culture medium that one hesitates to use it on the peritoneal surface of a necessarily infected wound."

Anent another cause of failure, he says: "If the margins of the opening in the transverse mesocolon contain fatty tissue, it should be sutured to the stomach rather than to the gastrojejunal suture line. Otherwise, it may form a collar-like mass constricting the opening."

Concerning such mechanical conditions as these it must be remarked that, while the operation of gastro-enterostomy is fairly standardized, surgeons differ so much in small, but important details, that each must study his failures in the light of his own methods.—W. M. B.

\* Wm. J. Mayo—Recurrences of Ulcer of the Duodenum following Operation, Boston Medical and Surgical Journal, January 29, 1914.

#### CONSERVATION OF THE INTERCOSTAL NERVES IN CELIOTOMIES.

In an earlier editorial (February, 1912), we noted the unwisdom of abdominal incisions through the linea alba, since the union of the single layer of fused fasciæ and peritoneum in the midline is often insufficiently strong to prevent the development of post-operative herniæ, especially after hypogastric laparotomies on women who have borne children; and we urged the advisability, therefore, of dividing the abdominal wall to one or the other side of the midline, i. e., vertically through the rectus abdominis sheath, which is, indeed, the routine practice of many surgeons.

This vertical incision through the rectus sheath, unless short, is apt, however, to expose one or more branches of the intercostal nerves and ilio-hypogastric nerve coursing transversely under the rectus muscle, and division of such a nerve probably enervates more or less of that portion of the muscle mesial to the incision. When this is not a wide portion the functional impairment is, as far as we have noted, negligible. Nevertheless, the possibilities of mischief from destruction of these nerves is evident, on a large scale, in the extensive pseudo-hernia that follows inadvertent division of the ilio-hypogastric trunk in lumbar operations.

For the full preservation of muscle function, therefore, it is advisable to avoid injury to these intercostal nerves in abdominal sections. Another reason is provided, from the experimental side, in the interesting study by E. P. Quain, published in this issue of the JOURNAL. His animal experiments indicate that "if a peritoneal surface deprived of its

intercostal nerve supply be subjected to a trauma, or to a trauma plus infection or irritation, such as may obtain during an operation, more adhesions and a more chronic infiltration of the peritoneum is likely to follow than if the same injuries were inflicted on a peritoneum with normal nerve supply." Nor does his demonstration lose force from the fact that in his experiments he enervated a much wider area of peritoneum than would suffer from division of an intercostal nerve in the rectus sheath. We regret that he did not add to his interesting study observations of the effect of the various nerve divisions upon the muscles themselves.

Quain states that enervation of the parietal peritoneum by injury to an intercostal nerve "will add another strong argument in favor of transverse abdominal incision." We do not think, however, that it is a controlling argument in favor of such an incision, although it may be true that the divided rectus may be reunited without loss of strength or function. But it does add another strong argument in favor of conservation of the intercostal nerves in abdominal section; and this can, and should be, accomplished even in long vertical incisions, either by care in avoiding injury to a nerve allowed to remain stretching across the wound or by gently retracting it to or towards the wound angles, to which latter procedure it yields surprisingly. There are few intra-abdominal procedures that cannot be carried out through a vertical rectus sheath incision, and that without dividing the nerves; and we believe, too, that the instances are relatively few, even in such deep-seated manipulations as are involved in operations on the common bile duct, in which this vertical muscle-splitting (or retracting) incision need be complicated by transverse or oblique division of the rectus fibers.—W. M. B.

## Surgical Suggestions

Vulvar verrucae, appearing suddenly without any ascertainable cause, are sometimes associated with a malignant growth in the uterus.

Nocturnal pruritus ani is often prevented, even cured, by inserting a fair-sized hard rubber or metal dilator into the anus for about fifteen minutes at bedtime.

In determining whether or not a female has been infected with gonorrhea, withhold definite conclusions if there are no early evidences. The first manifestation may be a salpingitis several weeks after the suspicious intercourse.

## Surgical Sociology

Ira S. Wile, M. D., Department Editor.

### THE PHYSICAL EXAMINATION OF RAILROAD EMPLOYEES.

In the general campaign for the prevention of accidents, great stress has been placed upon various educational measures. Industrial organizations have of their own initiative established schools for employees with a view to securing greater proficiency together with increasing safety. The protection of the American laborer involves the protection of the community, insofar as negligence may endanger human lives, particularly where transportation facilities are concerned. It repeatedly has been pointed out that the Government requires a careful physical examination of all candidates for the army and navy and rejects those physically unfit, even though the unfitness be of such relatively minor character as hernia, flat-feet and defective vision.

It would seem obvious that the railroads should endeavor to secure a higher plane of physical efficiency in their employees. It would not be exceedingly expensive to organize a plan for the systematic physical examination of railway employees with a view to eliminating at the outset, those physically unfit for public service.

According to the figures of the Interstate Commerce Commission, sixty-five to seventy per cent. of the accidents reported by railway officials are due to the carelessness of employees. The competence of many of the employees is limited by their physical defects. Safety in transportation is fundamentally dependent upon the physical and the mental competence of railway employees. The senses of sight and hearing, together with mental acuity and moral worth are essential to secure the reduction of railway accidents to an irreducible minimum.

Under the maritime laws, an examination and license of crews is mandatory. There appears to be little reason why a similar regulation should not be exacted from those responsible for transportation on land. The enactment of legislation that will secure the physical examination of railway employees, particularly engineers, firemen, conductors, brakemen, and switchmen will redound to the advantage of the public, the railroads, and the employees. Fully two million men are engaged in the railway services of this country. To base their employment upon physical competency would largely guarantee safe transportation in a more effective manner than is possible at the present time. Numerous railroads train their employees in the physical care of equipment and give more or less adequate training in the handling of rolling stock. Few, however, have appreciated the importance of giving thorough instruction to the employees in the responsibility of caring for themselves and of maintaining health upon a plane that will minimize the

human hazard that arises from preventable causes. Railway efficiency demands efficient workmen and of this railroads can be certain only through the institution of medical inspection as part of the routine of industrial organization.

#### THE REGULATION OF MIDWIVES.

The status of American obstetrics leaves much to be desired. Laying aside the responsibility of medical colleges for their failure to give adequate obstetrical training, one is confronted with the great problems of midwifery as it exists today. At the present time, practically forty per cent. of the women of this country are cared for by midwives. Recognizing this fact, is it desirable that midwives should be permitted to practice without regulation, supervision or control? The general attitude towards midwives has been one of toleration, indifference or neglect. In only six states is there a requirement that midwives shall be trained before receiving a license. Virtually, there is but one school for midwives maintaining high standards and that is the one established in connection with the Bellevue Training School which presents a six months' course for fifty pupils.

A study of the history of the midwives in England together with the workings of the Midwives' Act of 1902, as described in Bulletin 13, issued by the New York Committee for the Prevention of Blindness, indicates that the training and licensing of midwives has been successful. Under the jurisdiction of a Central Midwives' Board, a minimum standard has been established for all registered training schools to which instructors must conform. As a result of the careful and diligent supervision of inspectors, the maternal mortality from parturition has decreased; the infant mortality has been lessened; and blindness of the new born minimized. Obstetrical patients among the poor receive better instruction, more efficient nursing, and far more adequate obstetrical care. Inasmuch as the midwife is restricted to the care of normal cases of labor, there has been an increase in the amount of medical attention given to the poor. About fifteen per cent. of cases employing midwives have required the services of doctors.

Opposition to midwives has been based upon the false assumption that medical men are fully prepared to give the highest grade of treatment to all lying-in women. It is regrettable that the records of cases of puerperal sepsis and ophthalmia neonatorum evidence the fact that the proportion of these diseases appears to be greater in the practice of physicians than in that of midwives.

In the light of our present immigration and the character of the midwifery services that are available, it would seem more rational to raise the standards for all engaged in obstetrical work. Physicians need better training; a wider extension of the facilities of lying-in hospitals is necessary; the midwives require schools for their training, together with municipal control and state or municipal licensure. The problem is not to be solved by indifference or neglect. Recognizing present needs, the potential mothers of the community deserve

protection and the forty per cent. of childbirths that are in the hands of midwives calls for more active attention on the part of the community. There is a vital problem that must be solved, in order to establish midwives as cleanly, useful and co-operating social and obstetric agencies.

#### A SKULL AND CROSSBONES-SHAPED POISON TABLET WITH RESIDUAL "BONES."

JOHN NEELY RHODES, M.D.,  
PHILADELPHIA.

What surgeon has not asked the nurse time and again, "which is the mercury solution?" What surgeon has not put his keen edged knives into an unsuspected corrosive sublimate solution? I advocate that mercury and all other poison tablets be made in a certain form by all manufacturers. Furthermore, I would urge that poison tablets be doubly safeguarded by having glass crossbones in the middle of them. When a nurse drops such a tablet, say a "death's head" of mercury, into a vessel of water for use at an operation, both she and the surgeon will know after it has dissolved what the solution is, because of the tell-tale "bones."

It is a fact that corrosive sublimate tablets when sold by retail druggists are always put up in containers which have been carefully labeled with skull and crossbones labels, but the label on the container is no help in the dark. I know, too, that some druggists always put such tablets into peculiarly shaped bottles, and that some even use bottles that are covered with sharp spikes, still these accident poison cases continue to multiply. As nearly all the accidental poison cases occur at night it is necessary to have some warning device which will be serviceable day or night.

I know of one firm who advertises that they make diamond-shaped tablets of mercury. Other firms make tablets to be taken internally that are diamond shaped, and I have often seen candy tablets of the same shape. I know of another firm who makes poison tablets triangular shaped, and still another firm makes them in the shape of a coffin. I feel that all mercury tablets, if not all poison tablets, should be made in the same shape.

If it is finally settled that the shape shall be the horror-giving classical skull and crossbones, then let us go further and make the death's head nearly or quite unswallowable by superimposing it with glass "bones." The skull and crossbones-shaped tablet need not be so classical as to make the tablet too fragile, but should be somewhat spread out and flattened.

If the coffin-shaped tablet should be chosen as the best shape for warning and for utility, then let it be superimposed with "glass nails," so that it, too, would be rendered practically unswallowable, as well as to have a residual marking for the poison solution.

I would suggest that the tablets be made by the moulding process and not by the compressed tablet process. Of course the moulding board would have to be overhauled and so constructed that the "condyles or nail" heads would extend beyond the tab-

lets. To be sure, the unswallowableness of the tablet would be governed by the length of the "bones" or "nails." The "nails" or "crossbones" should have cast upon them the strength of the tablet in order that a surgeon might not only know that a given solution is a mercury solution, but also that it is a mercury solution of a certain strength.

Finally, I advocate that all poison tablets in this country and in foreign countries be made in *one specific shape*. I would urge the U. S. Government to insist that all manufacturers of poison tablets make them in the same shape. Furthermore, I would ask that they forbid candy manufacturers to make candy or cough drops in any similar shape. Thus, I would have the poison tablet placed in a class entirely by itself.

## Book Reviews

**The Pathology of Growth-Tumors.** By CHARLES POWELL WHITE, M.D., F.R.C.S., Director Pilkington Cancer Research Fund; Pathologist, Chrsel Hospital, Manchester; Special Lecturer in Pathology, University of Manchester. Octavo; 235 pages; illustrated. New York: PAUL B. HOEBER, 1913.

Over half of the text is devoted to the gross and histological features of the various types of blastomata; the remaining portions discuss the origin, life history, physiological and biological aspects and growth of tumors. The work is written in a didactic form and reflects the author's views exclusively. Indeed the book does not contain a single reference to any other author. The histological descriptions are rather brief and differ in nowise from those found in the conventional text-book. The discussion of the broader phases of tumor growth displays a wide knowledge of the subject. In general the author's views are those currently held by most pathologists. The only instance where the author reveals a divergence from the modern trend of medical thought is in his maintenance of hypernephroma as adrenal in origin. The illustrations are nearly all excellent photomicrographs.

**Practical Sanitation: A Handbook for Health Officers and Practitioners of Medicine.** By FLETCHER GARDNER, M.D., Captain, Medical Corps, Indiana National Guard; Health Commissioner of Monroe County, Indiana; and JAMES PERSONS SIMONDS, B.A., M.D., Professor of Preventive Medicine and Bacteriology, Medical Department, University of Texas; Lately Superintendent, Indiana State Laboratory of Hygiene. Octavo; 403 pages; illustrated. St. Louis: C. V. MOSBY COMPANY, 1914. Price \$4.00.

At the present time, when the science of practical sanitation is becoming so very important, a book such as this is of considerable usefulness. It endeavors to set before the reader the facts most necessary to a clear understanding of modern sanitary science. In a work of four hundred pages it is obviously impossible to more than outline the main points when such varied subjects are considered as epidemiology, including the management of epidemics, isolation, quarantine and disinfection; an account of each of the infectious diseases; a section on general sanitation, including statistical methods, school and factory inspection, sewage and garbage disposal.

In spite of this wide range of subjects, the material is treated in so terse a manner that a very large amount of information is placed at the reader's disposal. This book will undoubtedly be found of great use to the health officer, especially one who is so situated that reference libraries are not at his command. It is furnished with a very complete index.

**Infections of the Hand.** A Guide to the Surgical Treatment of Acute and Chronic Suppurative Processes in the Fingers, Hand and Forearm. By ALLEN B. KANAVEL, M.D., Assistant Professor of Surgery, Northwestern University Medical School, Chicago. *Second edition*. Octavo; 463 pages; 147 illustrations. Philadelphia and New York: LEA & FEBIGER, 1914. Price, \$3.75, net.

We sufficiently indicated in the review of its first edition, two years ago, the excellence and the general character of this unique monograph based on painstaking anatomical, experimental and clinical studies. Nothing has been added in the past two years to the pathology or the surgery of hand infections, and so thorough a work as this offered little room for alterations or additions. Nevertheless, it has been submitted by its author to a general revision. To several chapters résumés have been appended for hasty reference. About a dozen new illustrations have been introduced, and the legends under some of them have been amplified. The actual increase in the size of the book is about 20 pages.

We warmly commend a careful study of this work to every physician who undertakes the treatment of even the apparently trivial forms of infections of the fingers and hand.

**Practical Prescribing With Clinic Notes.** By ARTHUR H. PRICHARD, M.R.C.S., L.R.C.P., R.N. (Rtd.), Late House Surgeon, the Brompton Hospital, and Resident Surgeon, R. N. Hospital, Gosport. Octavo; 207 pages. London: HENRY FROWDE and HODDER & STOUGHTON, 1913. Price \$2.00.

The author in this book presents typical histories and descriptions of various diseases and then gives a detailed account of their treatment. The prescriptions used are printed in one column, while parallel to this are given the course of the illness and the various measures used in combatting it. The reader thus becomes acquainted with many various methods of caring for the same disease, as the course of each illness is given in detail and different remedies are applied on different days. Following the description of each illness is a short résumé of the pharmacological action of the drugs used, and the reasons for their employment.

The book may be recommended as a very practical one and one from which the reader may gain many helpful suggestions as to treatment.

**Studies Concerning Glycosuria and Diabetes.** By FREDERICK M. ALLEN, A.B., M.D. Large octavo; 1179 pages. Boston: HARVARD UNIVERSITY PRESS, 1913.

In this truly monumental work the author contributes his experimental studies on various phases of the subject which were carried out during a period of three years in the Harvard Medical School. Each study is accompanied by a thorough critique of the literature. Inasmuch as the author's researches concern nearly every phase of glycosuria and diabetes, the book forms a reference work of the very first order. As such it should be the fountain-head for most subsequent researches upon diabetes for many years to come. The value of the work is enhanced by seventy pages of bibliography. Unfortunately, there is no index.

**The Practitioner's Practical Prescriber and Epitome of Symptomatic Treatment.** By D. M. MACDONALD, M.D., Medical Officer of Health, Leven, Fife. 198 pages. London: HENRY FROWDE and HODDER & STOUGHTON, 1913. Price \$1.50.

This little pocket edition, besides containing tables of dosage, is chiefly made up of an alphabetically arranged list of diseases with brief suggestions as to their treatment. Naturally not very much information can be imparted when subjects are so briefly considered that the treatment of cholecystitis is given in four lines—that of cirrhosis of the liver in seven lines, that of endocarditis in a quarter of a page. However, the reader will find enough under each heading to afford a suggestion.

**Diseases and Deformities of the Foot.** By JOHN JOSEPH NUTT, B.L., M.D., Surgeon-in-Chief, New York State Hospital for the Care of Crippled and Deformed Children; Surgeon, Sea Breeze Hospital; etc., etc. Octavo; 293 pages; illustrated. New York: E. B. TREAT & COMPANY, 1913. Price \$2.75.

A survey of this small book does not reveal any information that cannot be derived from larger books devoted to the subject. The author states that "text-books on orthopedic surgery are rarely consulted by the general practitioner," and this thought appears to have guided him in the preparation of his work.

**Medical and Surgical Reports of Bellevue and Allied Hospitals in the City of New York. Volume V, 1911-12.** Edited by A. A. SMITH, M.D.; C. E. NAMMACK, M.D.; VAN H. NORRIS, M.D.; J. A. HARTWELL, M.D.

This volume of 456 pages contains 49 papers from the hands of various members of the medical and surgical staff of these hospitals. All of these articles have been published elsewhere, but it is very desirable that they should be collected in order to see the amount of work produced from this group of institutions.

**Diagnostic Methods.** By HERBERT THOMAS BROOKS, A.B., M.D., Professor of Pathology, University of Tennessee, Memphis. *Second edition.* 82 pages. St. Louis: C. V. MOSBY COMPANY, 1914. Price \$1.00.

As stated in the subtitle, this little book is a guide for history taking, making of routine physical examinations, and the usual laboratory tests necessary for students in clinical pathology, hospital internes and practicing physicians. It will be found especially useful as a handy reference in the clinical laboratory, for the various laboratory tests and reactions are carefully but very briefly described.

## Books Received.

**The Elements of Homoeopathic Theory, Practice, Materia Medica, Dosage and Pharmacy.** Compiled by DR. F. A. BOERICKE and E. P. ANSHUTZ. *Third, revised edition.* Duodecimo; 223 pages. Philadelphia: BOERICKE AND TAFEL, 1914.

**The Anatomist's Notebook.** A Guide to the Dissection of the Human Body. By A. MELVILLE PATERSON, M.D., Edin., F.R.C.S., Eng.; Professor of Anatomy in the University of Liverpool, etc. Small octavo; 350 pages; illustrated. London: HENRY FROWDE and HODDER AND STOUGHTON, 1914.

**Defective Ocular Movements and Their Diagnosis.** By E. and M. LANDOLT (Paris). Translated by ALFRED RAEMMELE, M.B., Ch.B., and ELMORE W. BREWERTON, F.R.C.S. Duodecimo; 99 pages; illustrated. London: OXFORD UNIVERSITY PRESS, 1913. Price \$2.00.

**The Unexpurgated Case Against Woman Suffrage.** By SIR ALMROTH E. WRIGHT, M.D., F.R.S. Duodecimo. New York: PAUL B. HAEBER, 1913. \$1.00, net.

**Practical Dietetics, with Reference to Diet in Disease.** By ALIDA FRANCES PATTEE, late Instructor in Dietetics, Bellevue Training School for Nurses, Bellevue Hospital, New York, etc., etc. *Eighth edition, revised and enlarged.* Duodecimo; 475 pages. Mount Vernon, N. Y. Published by THE AUTHOR, 1914. Price \$1.50.

**Causes and Cure of Crime.** By THOMAS SPEED MOSBY, Member of the American Bar; former Pardon Attorney of the State of Missouri; Member American Institute of Criminal Law and Criminology; Author of "Capital Punishment," "Youthful Criminals," "Alcoholism and Crime," "Mothers of Bad Boys," etc. Small octavo; 354 pages; illustrated. St. Louis: C. V. MOSBY Co., 1913. Price \$2.00.

## Progress in Surgery

A Résumé of Recent Literature.

**Free Transplantation of Fascia Lata to Replace Tendons and Ligaments.** (*Ueber die Freie Transplantation der Fascia Lata als Ersatz fuer Sehnen und Baender.*) K. GIERTZ, Umea, Sweden. *Deutsche Zeitschrift fuer Chirurgie*, Vol. 125, Parts 5 and 6.

An examination of the literature by Giertz does not reveal any cases that clearly demonstrated the advantages of fascia strips to replace tendons. Kirschner showed that the transplants are successful experimentally, but that they show a tendency to stretch. Isolated reports of partially successful transplants of fascia strips drawn through veins have been made. Giertz presents the details of three cases in which strips of fascia lata were employed to fill in gaps between the two ends of tendons. In one case the gap measured 15 cm. In every instance the result was very satisfactory, even though the dense scar tissue did not offer a very desirable medium for the transplants. The technic was very simple. Strips of fascia lata of the required size were removed, rolled up, and sutured with silk at both ends to the ends of the severed tendon. Early mobilization was practiced. In one instance a defect in an articular ligament was successfully replaced by fascia.

**Incidence and Diagnosis of Complicating Factors in Gastric and Duodenal Lesions.** EUSTERMANN. *The American Journal of Gastro-Enterology*, January, 1914.

The author has compiled this paper on the basis of 1800 cases operated upon at the Mayo clinic. The following points of interest were noted in this valuable article:

1. In 778 cases of duodenal ulcer, pyloric obstruction was noted in 194 or 26 per cent. In 324 cases of gastric ulcer, obstruction of the pylorus seen in 94 or 29 per cent.

2. Many cases of chronic perforation pursue their course without pain. Acute perforation often simulates acute appendicitis because the escaping fluids gravitate into the right iliac fossa. Perforation is noted in 28 per cent of all duodenal ulcers. Of 216 perforations, 4 were acute, 13 acute "protected," 65 subacute, and 137 chronic perforations.

Of gastric ulcers, 25.3 per cent perforate; of 82 perforations, 20 were subacute and 62 chronic ruptures.

Gastro-enterostomy was performed in practically all cases.

3. Gross hemorrhage from the mouth or bowel was present in 20 per cent of all duodenal ulcers.

**Six Cases of Megacolon.** BEUSAUDE and SORREL. *Archives des Maladies de l'Appareil Digestif et de la Nutrition*, 1914, VIII, page 1 (January).

Six cases of megacolon are reported, observed clinically, and with complete proctoscopic and radioscopic observations. The results are summarized as follows:

1. Five of the six cases present a valve formation, 13-17 cm. from the anus, visible distinctly with the proctoscope; upon forcing the way past this valve, the proctoscope enters the very much dilated sigmoid. All of the cases presenting this valve formation showed active clinical symptoms of their disease. The sixth case, without this valve arrangement, suffered no evidence of the malady. The valve formation disappears under anesthesia, and is due to a "bend" of the gut at this point.

2. There are three classes differentiated: (a) megacolon with latent symptoms; this class calls for medical treatment only. (b) Megacolon with intestinal symptoms; surgical treatment consisting of ileo-sigmoidostomy is sufficient. (c) Megacolon with intestinal symptoms accompanied by signs of a general intoxication; ileo-sigmoidostomy with resection of the involved intestine is indicated.

**Chronic Gastric Ulcer and Its Relation to Gastric Carcinoma.** Review of 684 specimens. W. M. MACCARTY and A. C. BRODERS, Rochester, Minn. *Archives of Internal Medicine*, February 15, 1914.

The question as to how frequently carcinoma develops in chronic ulcer of the stomach is obviously unanswerable, according to MacCarty and Broders. All that can be definitely claimed is a rather frequent association of histologically typical carcinoma in gastric ulcers. Of 684 specimens of ulcer excised in the Mayo clinic, 191 were chronic ulcers in which no histologic evidence of carcinoma was present; 472 presented the characteristics of simple ulcer plus the presence of carcinoma; in 21 specimens the presence of cancer was doubtful. The ulcer which contains the smallest amounts of carcinoma contains these in the mucosa of the borders and not in the base. This association should lead the practitioner to suspect malignancy in many clear cases of ulcer of the stomach. The differential diagnosis cannot be made by clinical methods, but only by the pathologist after the ulcer has been excised.

**Surgical Treatment (Splenectomy) of Diseases of the Blood.** (*Die Blutkrankheiten und Ihre Chirurgische Behandlung (Milzextirpation).*) R. MUEHSAM, Berlin. *Deutsche Medizinische Wochenschrift*, February 19, 1914.

A number of cases operated upon by the author and many others from the literature are analyzed. It is evident that splenectomy can have no effect upon infectious and septic processes in which the enlargement of the spleen is a small part of the general picture. It has no influence upon malaria and is contraindicated in leukemia. On the other hand, a well-timed splenectomy in Banti's disease may be fairly definitely counted upon to result in cure. The latter may obtain even in the third stage of the disease (ascites), when the removal of the spleen is combined with an omentopexy. Seven cases of infantile splenic anemia have been saved by the operation. In a series of cases of hemolytic jaundice, splenectomy appears to have had a very satisfactory outcome. A certain percentage of cases of pernicious anemia are definitely improved by the operation. It is as yet impossible to state in advance which cases will be benefited and for which the operation is of no avail.

**Lithiasis of the Branches of the Hepatic Duct.** (*La Lithiase des Branches de Bifurcation de l'Hépatique.*) E. QUÉNU and P. MATHIEU, Paris. *Revue de Chirurgie*, February 10, 1914.

This paper represents an effort to draw more widespread attention to a condition which, though not frequently encountered, presents a very difficult problem to the surgeon. After outlining the condition termed intrahepatic lithiasis and referring to an important paper by Beer on that subject, the authors describe minutely three cases of their own and four of Kehr's. In their cases the end result was finally good in all; one patient has remained well for four and a half years. The prognosis of this condition is nevertheless grave, for the lithiasis is generally of very prolonged duration, and recurrences are avoidable only with great difficulty. The authors insist upon the wide drainage of the involved ducts and upon second or even third operations upon manifestations of renewed biliary obstruction when lithiasis of the hepatic ducts coexists with intrahepatic lithiasis, the prognosis is even more grave. Two groups of cases of lithiasis of the ducts are described: one in which the stones are numerous and small; the other, in which the calculi are firmly adherent to the walls of the ducts.

**Sulphuric Ether Lavage in Infections. A Preliminary Clinical Report of 30 cases Treated by This Method.** G. DE TARNOWSKY, Chicago. *Journal American Medical Association*, January 24, 1914.

In a preliminary clinical report of thirty cases treated by the Souligoux-Morestin method of sulphuric ether lavage of the peritoneal cavity, De Tarnowsky says that his attention was called to the method during a recent visit to the Paris clinics where it is used in five hospitals as a routine measure in all laparotomies. It was his privilege

to watch the *modus operandi* and to notice the absence of unfavorable sequels. Eight years' experience with ether as a local disinfectant had convinced him already that it was harmless as regards cell degeneration, and he quotes the French authorities to the same effect. He began using it in his abdominal operations in the latter part of August, 1913, in both private and charity cases with uniformly gratifying results. The technic is described by him as follows: "After removal of pathologic tissue free pus is carefully wiped out; then ether is freely poured into the abdomen and is allowed to come in contact with all of the viscera in a case of general peritonitis. The viscera are literally washed in ether, hence the term 'lavage' adopted by the French. As much as a quart of ether has been thus used. After having remained in contact with the abdominal organs for from two to five minutes, it is mopped out by means of gauze sponges and the abdomen is closed with one small drain. In circumscribed peritonitis the pus cavity, having been wiped out, is filled with ether and the abdomen is closed without drainage. In pelvic peritonitis, ether-soaked sponges are applied to all involved surfaces, and then two ounces of ether are poured into Douglas' pouch and the abdomen is closed without drainage. The immediate effect of ether, thus applied, is to cause a momentary capillary contraction followed by a hyperemia of the viscera. There is a moderate formation of carbon dioxid in the abdomen, evinced by a bubbling sound and the escape of bubbles from the surface of the ether. Ether is slowly absorbed by the serosa; this is proved by the fact that no change in the anesthesia of the patient has been reported to date." De Tarnowsky's thirty cases included three cases of gangrenous appendicitis with general peritonitis, four cases of localized abdominal peritonitis, two of pelvic peritonitis, and one of acute cholecystitis with adhesions in which the bactericidal action was very apparent. The remaining cases were not acutely septic. In 75 per cent the postoperative pain and restlessness were lessened and were not increased in the remaining 25 per cent. He is convinced that there is less pain than there is ordinarily encountered, and there was no mortality in this series. Experimental study on animals is being carried on by Dr. Bissel in the Cook County Hospital and will be reported later.

**Laryngectomy With Associated Gastrostomy.** (*Laryngectomie mit Beigefügter Gastrostomie.*) F. TOREK, New York. *Zentralblatt für Chirurgie*, December 27, 1913.

Torek calls attention to the difficulty in feeding patients after total laryngectomy. The usual method, i. e., by a tube passed into the esophagus, is attended by the great danger of infection of the wound. In order to obviate this, Torek recommends that at the completion of the laryngectomy (which can be done under a local anesthesia) a gastrostomy according to the method of Witzel be performed. In one case in which this procedure was done, the post-operative healing of the laryngectomy wound was unusually free from the complications of infection.

**Autogenous Vaccine in the Treatment of Hay Fever.** P. M. FARRINGTON. *The Laryngoscope*, January, 1914.

The author injects a vaccine prepared from a film of secretion from along the middle turbinates transferred to agar tubes. An average of two hundred million bacteria were given every fourth day for nine injections. The results were as follows: Out of the twenty-five patients treated, thirteen were cured, six markedly improved, three slightly improved, and three failures. Of the thirteen patients cured, eight had asthma as a complication; of the six markedly improved, five had asthma.

**On the Use of Electro-magnets in the Extraction of Metallic Bodies From the Trachea and Bronchi, With Report of Cases.** SAMUEL IGLAUER. *The Laryngoscope*, January, 1914.

In the literature eleven cases are recorded in which extraction by electro-magnets was undertaken. Seven of these cases were successful. A review of the recorded clinical cases, as well as of the writer's, leads to the conclusion that in exceptional instances the electro-magnet may prove of great value in the extraction of foreign



bodies from the lungs. These cases would be limited to that group in which the foreign body was beyond the reach of a bronchoscope or was concealed in profuse secretions. The magnet may also attract the foreign body and thereby shorten the search when an external operation becomes necessary. In the vast majority of instances, however, the bronchoscope will remain the instrument of choice.

**Acute Phlegmonous Epiglottitis.** M. D. LEDERMAN.  
*The Laryngoscope*, January, 1914.

This condition is an infectious process involving the submucous structures of the epiglottis and contiguous tissues. In the four cases which came under the writer's observation suppuration accompanied the inflammatory syndrome. The disease is characterized by a sudden onset with distinct local manifestations. There is usually a sharp pain in the throat accompanied by painful deglutition and a sense of fullness or obstruction in this region. The voice is distinct and guttural. These symptoms rapidly progress and may assume a serious aspect in a few hours. At times the attack is ushered in with a chill, followed by a rise of temperature. Examination shows an enormously swollen epiglottis, sometimes three or four times its natural size.

**Operative Technique for Conservation of the Superior (Fronto-Palpebral) Branches of the Facial Nerve in Total Extirpation of the Non-Cancerous Parotid.** (*Conservation des Rameaux Supérieurs (Fronto-Palpebraux) du Facial dans l'Extirpation Totale de la Parotide en Dehors du Cancer Technique Opératoire.*) P. DUVAL, *Revue de Chirurgie*, February 10, 1914.

One of the early symptoms of cancer of the parotid is the involvement of the facial nerve, and the author therefore does not plan his procedure for carcinoma of the gland. However, it is now well established that radical removal is often indicated for "mixed" tumors of the parotid as well as for frankly benign ones. Intraglandular enucleation has been the rule, because of the fear of injuring the facial nerve; recurrences have frequently followed this procedure. The author's plan is a radical extirpation combined with the sacrifice of the lower branches of the facial nerve and the conservation of the upper. He believes that injury of the facial is of great significance only when the upper branches are affected.

The facial nerve penetrates the parotid at a much higher level than is generally supposed. Duval's technique is based upon exposure of the nerve before it enters the parotid, and following only the fronto-palpebral branch in the posterosuperior angle of the gland.

One incision, commencing at the mastoid, follows the anterior border of the sternomastoid. This is joined by an incision circling the ear and extending along the zygoma. The sternomastoid is divided at its origin, and the carotid artery is ligated above the lincal. The posterior border of the parotid tumor is drawn forwards and the posterior belly of the digastric is divided. In front of the latter the facial trunk is exposed, and the bifurcation seen. The lower branches are readily determined and are sacrificed. The nerve is then readily mobilized. Beneath it lies the deep part of the gland; this portion is drawn to the surface, to be excised with the rest of the parotid. The rest of the operation proceeds along the classical lines. After extirpation of the parotid the divided muscles are reunited.

This procedure has been employed by Duval in two cases. The photograph of one patient shows little damage as the result of the partial division of the nerve.

**The Prognosis of Sarcoma of the Testicle.** E. H. CODMAN and R. F. SHELDON, Boston. *Boston Medical and Surgical Journal*, February 19, 1914.

Inasmuch as the opinions expressed in text-books regarding the prognosis of malignant tumor of the testicle are vague or conflicting, the authors studied the results in 80 cases occurring in the Massachusetts General Hospital during the past forty years. In 63 cases a pathological examination was made. The end-results could be determined in 64 cases of the entire number. Of these, 39 died from the disease, 13 were living and well, and 12 died

from other causes. In the operated cases, there was a mortality of 59.83 per cent. In four of the 64 cases, the testicle was undescended, confirming the belief that undescended testes are more subject to malignant degeneration. Of 33 operated cases that died from the disease, 21 had no sign of metastasis at operation, yet death occurred in all within three years. Only 12 showed metastasis at operation. In 21 cases in which the location of the metastasis was mentioned, 13 were abdominal.

**Further Observations on the Use of the High Frequency Spark for the Relief of Prostatic Obstruction in Selected Cases.** H. G. BUGBEE, New York. *Medical Record*, February 14, 1914.

Bugbee recommends the high frequency spark, applied through the cystoscope in the manner devised by Beer for intravesical papillomata, for certain cases of prostatic obstruction. He gives a tabulated report of 14 cases, all of whom have either been cured or were greatly relieved. The cases for which he recommends this method of treatment are the following:

1. Small fibrous prostates, which form a hard ring about the vesical neck, not only constricting the internal urethral orifice, but interfering with the function of the internal vesical sphincter muscle.
2. Elevations of the median portion of the gland in the form of a bar, an elevation of the trigone, or more or less distinct median lobe, without general enlargement of the prostate.
3. Irregular prostatic lobes, narrowing the vesical outlet, or nodules of prostate left after incomplete prostatectomy.
4. Enlargement of the prostate of whatever size and form, where open operation is refused or contraindicated by the condition of the patient.

For the technic of application, the reader is referred to the original paper.

**Observations Following the Use of Collargol in Pyelography.** CECIL W. VEST, Baltimore. *Johns Hopkins Hospital Bulletin*, March, 1914.

Summary.—At operation, collargol has been found in the kidney and perirenal tissues in five of our cases, and in one case in the peritoneal cavity. The kidney and perirenal tissues in these cases were colored dark brown or bluish black and were edematous. The amount of discoloration was noticed in one instance to extend throughout the entire retroperitoneal space of the side injected. In this case a retroperitoneal abscess developed which necessitated a second operation.

The time between the injection and operation varied from one to five days.

Both 10 per cent and 15 per cent solutions were used. No difference in the resulting clinical symptoms was noted.

Pain may be quite severe, lasting for two or three days, and once for ten days.

As shown by the charts, there may be a definite rise in temperature, 102°F. being reported in two cases and 104°F. in another.

While no case of nephritis has been shown to accompany these symptoms, there are definite urinary changes. The examinations have shown white blood cells, red blood cells, with hyaline and granular casts, to be present three days following the injection; casts for nine days; and albumen in two for twenty-four days; while in a third a trace was detected after 118 days.

In three cases where collargol was used, death has followed, but it is not evident that it was precipitated by the collargol.

Collargol should be used only when absolutely necessary. It should be allowed to run into the renal pelvis in small amounts and under very low pressure.

A freshly prepared solution, not over 15 per cent, should be used.

It is necessary that the symptoms here mentioned be known by those using this method of pyelography, and especial care be exercised to avoid their occurrence.

On account of the results here shown, some other medium must be sought which will give a shadow by not injuring the renal substance. After a more extensive use of silver iodide emulsion, this material may be found to serve well.

**Cancer of the Prostate.** P. J. FREYER, London. *The Urologic and Cutaneous Review*, February, 1914.

This is a clinical presentation of the subject and does not deal with the pathology of the disease and its development from adenofibroma of the prostate (Albarran, Hallé); 13.4 per cent of 1276 cases of prostatic enlargement were clinically carcinoma. The condition is therefore much commoner than is generally supposed. The symptoms of malignant disease of the prostate resemble those of ordinary prostatic enlargement. It is very important, however, to note that the symptoms run their course rapidly, in a few months, in fact. Carcinoma should be suspected if the symptoms develop in individuals under fifty or over seventy years of age. It is not necessary to enumerate the symptoms of advanced prostatic carcinoma. Freyer insists that hematuria is a symptom of prostatic hypertrophy rather than of carcinoma, except if the latter be very advanced.

The passage of a soft catheter often aids greatly in the diagnosis. In the majority of cases of benign enlargement the coude catheter easily enters the bladder; in malignant disease the catheter meets with a sudden resistance in the prostatic urethra owing to the dense and unresisting tissue. There may also be pain and a little bleeding as a result. Upon rectal examination the cancerous prostate may present nodules, irregularities, especially the advanced tumors. The most significant feature of malignant disease of the organ is its immobility.

Palliative treatment can alone be practiced for advanced carcinoma. When the growth is yet confined to the interior of the capsule, the results of suprapubic prostatectomy are very good indeed. The details of a number of the cases are presented.

**Corynebacterium Hodgkini in Lymphatic Leukemia and Hodgkin's Disease.** A. E. STEELE, Boston. *Boston Medical and Surgical Journal*, January 22, 1914.

Steele isolated a diphtheroid organism identical with that first discovered by Negri and Miermet, in one case each of lymphatic leukemia and Hodgkin's disease. Inasmuch as this observation has been confirmed by Bunting and Yates in seven cases of Hodgkin's disease and by Billings and Rosenow in twelve cases of the same malady, the probability that this organism has some definite relation to Hodgkin's disease is rather strong. Billings and Rosenow have suggested a vaccine for purposes of treatment, but thus far no results have been reported.

**Two Female Xiphopagi (Deux Fillettes Xiphopages).** DR. G. LEFILLIATRE and DR. AUBOURG. Paris, France. *Paris Médical*, February 14, 1914.

The authors give a detailed account of two female children who are united by a bridge of tissue at the level of the xiphoid cartilage. The parents were healthy, the mother being forty-four years of age. Pregnancy was normal and the labor proceeded apparently normally until, after the presentation of the head, all progress stopped. By inserting the hand into the uterus it was found that the fetus was a "monster" and that the second fetus was in a transverse position. A podalic version was performed on the latter and the two children were extracted together, one by the head, the other by the foot. This necessitated a rotation of the bridge of tissue uniting the children, which, however, did not seem to do any harm, for the babies appeared to be quite normal.

The temperatures and blood counts of these two individuals differ. X-ray examination shows that the bridge of tissue contains a rod of cartilage, but apparently no vital organs with the exception of the occasional passage of coils of small intestine from one abdominal cavity into the other during deep expiration. This was repeatedly shown by bismuth x-ray plates.

The children gained in weight on breast milk, and the authors consider them excellent cases for surgical intervention.

**Operative Treatment of Internal Hydrocephalus in Infants.** (*Traitement Opératoire de l'Hydrocéphalie Interne chez les Enfants.*) L. M. PUSSEY, St. Petersburg. *Revue de Chirurgie*, December 10, 1913.

The author has practiced his operation in twenty infants suffering from hydrocephalus from various causes. The procedure, in brief, consists in an exposure of the right (generally) parietal lobe through a flap incision. The dura is incised, the ventricle aspirated, and a small silver canula is fixed in the ventricular cavity. The fluid escaping from the canula drains into the subcutaneous space. This procedure has been curative in several cases in which the cause of the hydrocephalus is a benign one (inflammatory closure of one of the exits for the fluid). In no instance did the presence of the canula prove irritating. The operation gives the best results only when general treatment is actively carried out.

**Technic of Neosalvarsan Injection Into the Jugular and Scalp Veins of Infants.** GERMAIN BLECHMAN, Paris, France. *Paris Médical*, January 31, 1914.

The author gives a precise account of the technic of injecting neosalvarsan intravenously in infants. In an experience of one hundred cases he has had excellent results in using the external jugular veins or the veins of the scalp. No preliminary dissection is necessary, and if one has fine calibrated needles with sharp points, as a rule there should be no difficulty in entering the vein. Three assistants are necessary to keep the child perfectly quiet during the injection. Neosalvarsan was used in all the cases. It was given once a week or every two weeks for five to seven injections. The initial dose was at least 1 centigram per kilo; the final dose was 1½ centigram per kilo. However, in children under one year no dose was larger than 2 centigrams, regardless of the weight of the child.

The author claims to have had very little difficulty with the technical part of the drug's administration and believes this to be the method of choice. Only twice did a hematoma from a previous injection interfere with the technic and this was overcome by waiting a few days for its subsidence.

The therapeutic results from neosalvarsan were excellent.

**On the Diagnosis of Luxation and Separation of the Meniscus.** (*Zur Diagnose der Meniscusluxation und des Meniscusabrisses.*) E. BIRCHER, Aarau. *Zentralblatt für Chirurgie*, November 29, 1913.

The diagnosis of the above mentioned conditions is oftentimes attended by much difficulty, especially if the luxation or separation is of minor degree. Bircher has found that auscultation of the knee during slow passive flexion and extension affords a positive means of diagnosing these conditions. A peculiar rubbing sound is heard on the medial or lateral edge of the meniscus. The sound is more pronounced during flexion than in extension. This sign was confirmed at operation in six or seven cases.

**Juvenile Hyperthyroidism.** W. H. LEWIS, Rochester, Minn. *The Saint Paul Medical Journal*, February, 1914.

In a period of eight years there have been 1,512 patients operated upon at the Mayo clinic for exophthalmic goiter. Of this number five were under ten years of age (one in three hundred cases). Lewis gives a brief history of each of these five children and discusses the symptomatology of hyperthyroidism in childhood.

In each of these cases there was a firm, noticeably enlarged thyroid apparently hyperplastic to the touch. The following symptoms were noted: vasomotor disturbance of the skin in one, tremor in three, mental irritability in four, tachycardia in five, exophthalmos in five. All the other features observed in the disease in adults participate in the vigorous activities of their associates without apparent cardiac or muscular distress, while none of them even approached the crisis so frequently seen in adults.

A double ligation was performed on three of these patients; in two a portion of the thyroid was resected, one being preceded by a single ligation, all of which operations gave prompt and, up to date, satisfactory results, in contradistinction to adults, most of whom do not seem to be safe without a thyroidectomy. All the patients were girls, their ages ranging from four to eight years.

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## THE INSUFFICIENCY OF THE ILEOCECAL VALVE IN THE X-RAY PHOTOGRAPH.

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BERLIN, GERMANY.

There are two methods of examining the intestines by the  $x$ -rays. The first is the filling per os by the Rieder contrast meal, consisting of 350 grammes of gruel and 50 grammes of carbonate (not nitrite) of bismuth or 75 grains of sulphate of barium. It is necessary to get a pure preparation of the barium, as there have been fatal intoxications from soluble salts of barium. Such accidents can be avoided by prescribing barium sulphate purissimum for  $x$ -ray purposes. If the stomach and the small intestines are normal, they will both be emptied six hours after such a contrast meal, and the whole bismuth shadows will be found in the colon ascendens, and by further examinations, after 9, 12, 24 hours, one will be able to examine gradually the whole colon. But if there is a stricture in the stomach or in the small intestine, bismuth ingesta will be found even after a longer period in the jejunum or ileum. Not every retention after six hours, however, is due to a stricture of the small intestine. For Schwarz<sup>1</sup> found out that in cases of enteroptosis there are often, after 9 or 10 hours, still some bismuth shadows in the lowest loops of the ileum. Groedel<sup>2</sup> directed our attention to another group of cases that show the same retention in the lower parts of the small intestine, and these, too, where there is no stricture of the intestine, as it is easy to find out by the second standard method of examining the intestine by the aid of the  $x$ -rays: the contrast enema. It consists of an emulsion of 150-200 grammes of sulphate of barium, 300 grammes of bolus alba, and lukewarm water to the total amount of one liter of liquid. Such an enema, injected under a pressure of not more than half a meter of height, will in normal cases fill the whole colon up to the cecum. But there are cases in which this contrast enema, as the  $x$ -ray plate will demonstrate, penetrates through the ileocecal valve into the lower loops of the ileum. This symptom of insufficiency of the valve is, as Groedel has shown, often connected with a retention of the contrast meal in the ileum, and he supposes that this is caused by the flowing

back of the cecal contents into the ileum during digestion. As he observed this insufficiency of the valve in cases of chronic appendicitis, he suggested a causal connection between the appendicitis and the dehiscence of the valve, and he believes that the inflammatory swelling of the cecal mucosa and the adhesions occurring in most of the cases call forth the insufficiency of the valve. The pains of which his patients complained are to his idea caused by the irritation of the small intestine through their abnormal contents.

Dietlen<sup>3</sup> was the first who denied that this insufficiency of the valve was a typical pathological symptom; he found it, it is true, in a certain number of cases associated with chronic appendicitis, but also in other cases where there was no affection of the appendix, but other pathological changes in some other part of the colon or its neighborhood. He observed this insufficiency of the valve in cases of spastic obstipation, of obstipation of the so-called ascendens typus, pericolitic, and pericholecystitic adhesions and even in a case of hydrops of the gall bladder and of spondylitic abscess. Lohfeldt,<sup>4</sup> too, who observed the symptoms in two cases of perityphlitis, does not consider it as a sign of any diagnostic value.

I myself have observed this insufficiency of the ileocecal in eight cases; in only three of which there was an inflammation of the appendix.

CASE I. Mr. B., over 60 years old, fell suddenly sick with heavy pains in his right side; there was a slight irritation of the peritoneum with a distinct meteorism and a muscular spasm over the ileocecal fossa, but no fever. On account of his age, no immediate operation was performed, and he slowly recovered, but the meteorism was still noticeable, especially in the right side of the abdomen. The  $x$ -ray examination showed that six hours after the contrast meal the small intestine was already empty, but that there was insufficiency of the valve.

CASE II. Mr. F. suffered for some weeks from pains in the ileocecal region. There was continuous resistance in the ileocecal fossa, and McBurney's point was sensitive even to a slight touch. In this case, too, the  $x$ -ray observation showed that the contrast enema ascended into the smaller intestine. There was no operation.

CASE III. Mrs. P. suffered for two months from pains in her right side and there were all the signs of a chronic appendicitis. Six hours after the contrast meal I found ample residues in the small intestines and when an enema (one liter of liquid) was administered, she complained of having pains in her abdomen. On the *x*-ray plate, some of the lower loops of the small intestine were filled with the bismuth enema. The patient was operated upon and we found adhesions fixing the base of the appendix to the cecum and the tip to the side walls of the pelvis.

This condition seems to me to be a complete explanation for the insufficiency of the valve. The appendix fixed through adhesions to the side wall of the pelvis is always pulling on the lower parts of the cecum and may in that way cause the dehiscence of the valve. But the pains of which the patient complained during the injection were certainly not due to the flowing back of the enema into the ileum, as Groedel supposes, for in my case I could observe the filling of the small intestine long before the patient complained of pains. In some other cases, which showed the same dehiscence of the valve, there were no pains during the injection of the enema, and some of my patients, who certainly had a normal ileocecal valve, suffered pains during the enema. I perfectly agree with Dietlen that the pains are due to the pulling of the adhesions in the neighborhood of the cecum.

In these three cases I am convinced that the appendicitis is responsible for the insufficiency of the ileocecal valve. But in the five other cases there were no signs of perityphlitis at all, though in the next one there might have been pericolic adhesions.

CASE IV. Mrs. G., 68 years old, had suffered for some years from attacks of pains in the right side of the abdomen, with signs of intestinal obstruction. She never had any symptoms suspicious of appendicitis. Considering her good general condition, the long duration of her disease, and the lack of any other intestinal trouble in her record that might have produced a stricture, the probable diagnosis was ileus caused by pericolic adhesions. The *x*-ray examination showed no abnormal function of the bowels, save the insufficiency of the ileocecal valve.

In the next two cases the appendix had previously been removed.

CASE V. Miss C., a girl of 18 years, with all signs of neuropathic constitution, had been operated upon half a year before for chronic appendicitis. The appendix contained two fecal stones and was

fixed to the cecum by numerous adhesions. The stump of the appendix was buried and the mesenterium was sutured in such a way as to cover it also with normal peritoneum. Four months after the operation she began to complain of attacks of colics in the abdomen. The *x*-ray examination showed remnants of bismuth chyme in the small intestine six hours after the meal and revealed also insufficiency of the valve. A thorough examination under narcosis disclosed the existence of a tumor of the genitals, and a dermoid cyst of the left ovary as big as an apple was removed; but unfortunately we forgot to look after the ileocecal region and see if there were any adhesions.

CASE VI. Mrs. R. had been operated upon four years before for purulent peritonitis and gangrenous appendicitis. One year later there was another operation for hernia of the abdominal wall, during which we found numerous adhesions between the bowels. Since then she had suffered from attacks of ileus, occurring once or twice a year and during which I always observed in the region of the flexura coli dextra an enormously dilated intestinal loop. Those attacks have until now always passed away under conservative treatment. After the last attack, however, I made an *x*-ray examination, hoping to find the seat of the supposed obstruction in order to have the necessary information if an operation proved necessary. But I could find nothing abnormal in the position or the function of the intestine, except the insufficiency of the valve.

I think we have a right in this case to suppose that there is a band in the neighborhood of the flexura hepatica, due to the previous peritonitis, which, under certain unknown circumstances, produces the intestinal obstruction. During such attacks, the colon ascendens is dilated, as we are able to observe, so that the valve becomes insufficient. *Genersich*<sup>5</sup> has observed that by gradually dilating the large intestine we can artificially produce the dehiscence of the valve and he used for therapeutic purposes enemas of 6-9 liters of liquid in order to clean even the higher loops of the small intestine. I think the same dilatation of the cecum and dehiscence of the valve will easily occur in cases of obstruction in the lower parts of the colon. A similar condition may have existed in the last two cases.

CASE VII. Mrs. H. suffers slightly from constipation and she frequently observed traces of mucus in her feces, but she has no enteritis muco-membranacea. She complained of pains in the right side of her abdomen, which her family physician

thought were caused by cholecystitis, but it was not possible to get a clear idea of her condition. The *x*-ray examination showed that there was a considerable ptosis of the stomach and of the large intestine, so that the colon transversum formed very acute angles with the rest of the colon, but as far as I could judge there were no adhesions on these angulations. Ten hours after the contrast meal I still found bismuth chyme in the lower parts of the ileum and by an enema of one liter of liquid I could easily fill many of the lower loops of the small intestine.

Groedel would perhaps in this case accuse the catarrhal swelling of the mucosa of the colon of the dehiscence of the valve. But I cannot agree with that argument. To my thinking a swollen valve ought to shut easier and earlier than a normal one. I rather suppose that the sharp angulations at the hepatic and splenic flexures may at certain moments form an obstruction to the passage of the feces and produce a dilatation of the different loops and in that way the insufficiency of the valve. The same mechanism may prevail in the cases of chronic obstipation observed by Dietlen, and also in the last case that showed a gross impediment to the passage of the feces in the form of a cancer of the colon.

CASE VIII. Mrs. H. suffers from a cancer of the colon descendens, which quite to my astonishment was not to be demonstrated on the *x*-ray plate, but I found a very pronounced insufficiency of the valve. The operation explained to me why the *x*-ray this time had deceived me; the cancer was ulcerated and did not constrict the lumen of the colon; the big tumor that I had felt through the abdominal wall was a metastasis in the mesocolon. But earlier there must have been a stricture of the colon, for the patient had suffered from very obstinate constipation, alternating with diarrhea, and during that period there must have been a dilatation of the colon ascendens that finally caused the insufficiency of the valve.

Of course, it would be very easy to maintain that in all those cases there were chronic perityphlitic inflammations, not to be discovered by the clinical examination. It is true, we often find in a patient on whom we operate in what we believe is his first attack of appendicitis very grievous alterations due to former inflammations, that certainly occurred without any manifestation. Further investigation is therefore indicated. It is particularly important that whenever a patient is operated upon, who had shown evidences of insufficiency of the ileocecal valve, the region of the cecum should be examined

and the presence or absence of adhesions be determined. But as I have in my cases always found pathological alterations that explain the mechanism of the dehiscence, I would much rather consider those abnormal conditions to be the reason of the dehiscence. There is no doubt that even a very slight cause may bring about the insufficiency; Schwarz<sup>2</sup> has observed that a superficial massage may overcome the resistance of the valve and produce the reflux of the contents of the colon in the small intestine. Singer and Holzknacht<sup>3</sup> observed the insufficiency of the valve in cases of spasm of the colon, and they suppose that it is due to the increase of intestinal pressure during the spasm, a mechanism similar to that which I assume for some of my cases. The most serious causes and the slightest changes may thus make the valve insufficient; Katsch<sup>4</sup> even observed the symptom in healthy persons, who did not suffer from abdominal troubles at all, and a similar observation is related by Dietlen.

We therefore have no right to argue that the insufficiency of the ileocecal valve is a sign of perityphlitis, as Groedel supposed. I do not even agree with Lohfeldt that pains during the administration of the contrast enema occurring in patients with this symptom are a sure sign of adhesions due to appendicitis. I think that Dietlen's and my cases demonstrate with perfect evidence that the most varied pathological alterations in the whole colon and even in the neighboring tissues may under certain circumstances produce the insufficiency of the valve. And if it is proven that even perfectly healthy people may show the same symptoms, I think I have made clear that the insufficiency of the cecal valve is a symptom that cannot claim any pathognomonic value—one that we may register as a curiosity, but that does not permit any diagnostic conclusions.

<sup>1</sup>Schwarz: Die Erkennung der tieferen Dünndarmstenose mittels des Röntgen verfahrens wiener Klinische Wochenschrift, 1911, No. 40.

<sup>2</sup>Groedel: Die Insufficienz der valvular ileocecalis im Röntgenbild. Fortschritte auf dem Gebiet der Roentgenstrahlen. Bd. XX, Heft 2.

<sup>3</sup>Dietlen: Die Insufficienz der Valvular ileocecalis im Röntgenbild. Fortschritte auf dem Gebiet der Röntgenstrahlen, XXI, 1.

<sup>4</sup>Lohfeldt: Über Insufficienz der Valvular Bauhini und ihr Verhalten unter dem Leuchtschrein. Aerztlicher Verein, Hamburg 4. XI, 1913, Autoreferat, Münch. Mediz. Wochenschrift, 1913/49.

<sup>5</sup>Genersich: Le lavage du canal digestif. Progrès. Médical, XXI, 38.

<sup>6</sup>Schwarz: Die Röntgendurchleuchtung des Dickdarms während des Einlaufs als Hilfsmittel zur Diagnose stenosierender Bildungen. Wiener Klinische Wochenschrift, 1912-16.

<sup>7</sup>Singer und Holzknacht: Die objectiven Symptome des chronischen Colonspasmus. Deutsche Medizinische Wochenschrift, 1912-23.

<sup>8</sup>Katsch: Discussion to the Lecture of Lohfeldt. Arztl. Verein, Hamburg, 4. XI, 1913, related Münchener Med. Wochenschrift, 1913, No. 49.

In hydrocele and other scrotal operations a transverse incision, preferably in one of the skin folds, produces a far better cosmetic result than the vertical incision generally employed.

## EVIL RESULTS OF COLLES' AND POTT'S FRACTURES, AND HOW TO AVOID THEM.

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The reduction of a fracture is an operation that every physician is, at some time or other, called upon to perform. Upon the physician's ability to properly recognize the condition he is dealing with and upon the employment of the proper method of reduction and the maintenance of that reduction, depend the ultimate results. Directly proportionate to the degree of luxation of fragments and their proximity to joints are the loss of function and the deformity. A fracture of a long bone near a joint is more difficult of reduction and retention than when the fracture is near its middle; for one of the levers is necessarily unstable and difficult to hold in place.

To obtain uniformly good results, three things are necessary:

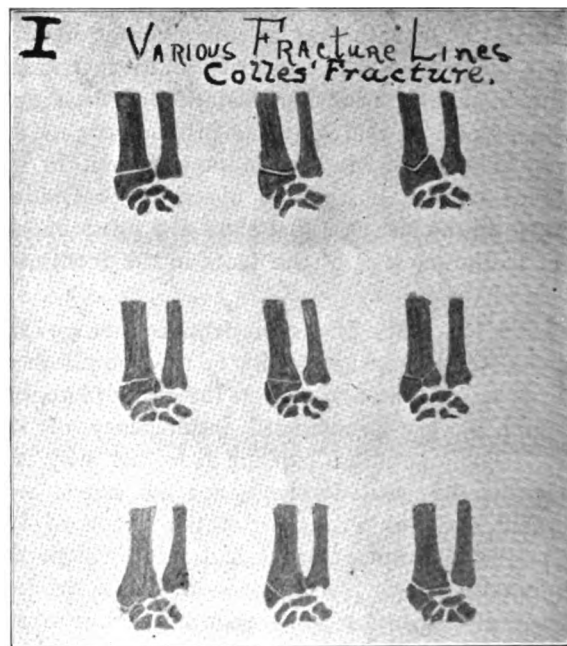
First, a positive and proper appreciation of the condition one is called upon to deal with—and by this I do not mean that it is sufficient when we see a silver-fork deformity to say that we are dealing with a Colles' fracture. It is necessary to make a most accurate diagnosis of associated lesions present; and there is but one way to do this: X-ray your fractures; in most cases a fluoroscopic examination is perfectly satisfactory for making a correct diagnosis, or confirming one previously made. If this is impossible to obtain at the time of the accident, it should be done as soon as possible thereafter; and it will be a revelation how many times a supposedly proper reduction will be found faulty, and how many times unsuspected additional lesions will be found. The fluoroscope should be supplemented by a radiograph.

Secondly, do not attempt reduction of a fracture about a joint (or for that matter, any fracture) except under an anesthetic; it saves lots of hard work on your part and pain and suffering to your patient. Moreover, in many a fracture easy coaptation is obtained under an anesthetic which it has seemed impossible to obtain with the conscious patient.

Next, and most important, is the proper retention of the reduced fracture, and this is most effectually done if the mechanical principles involved in a fracture are clearly understood. The lines of force producing the fracture are often productive of other lines of force which resist reduction and re-establish the luxation; if a proper understanding

of the lines of direction is not had, and the counterbalance employed. Compare carefully the injured part with the opposite uninjured part of your own normal member. Location of bony prominences in relation to each other must be carefully considered; length of limb and often circumferential measurements will add valuable data toward a diagnosis. Inability to make certain motions or abnormal motion about a joint is conclusive of serious disturbance. Crepitus is of course proof of the solution of continuity of bone, as it is produced by the rubbing of the broken ends upon one another.

But let me here give a warning. When called to examine a possible fracture, do not disregard all the physical signs present and begin to hunt for crepitus. Many a poor functional result has been produced by this rough forward and backward, in-



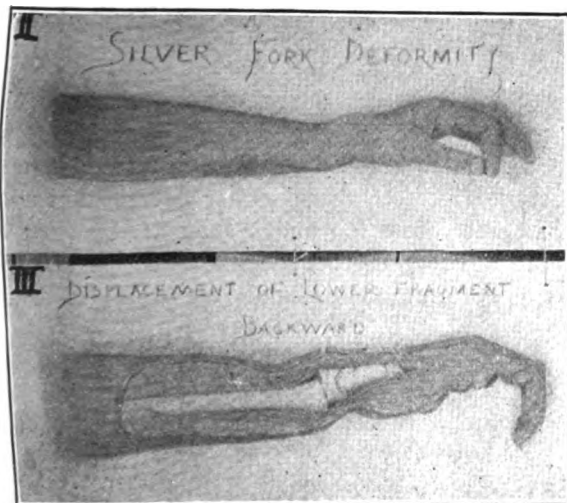
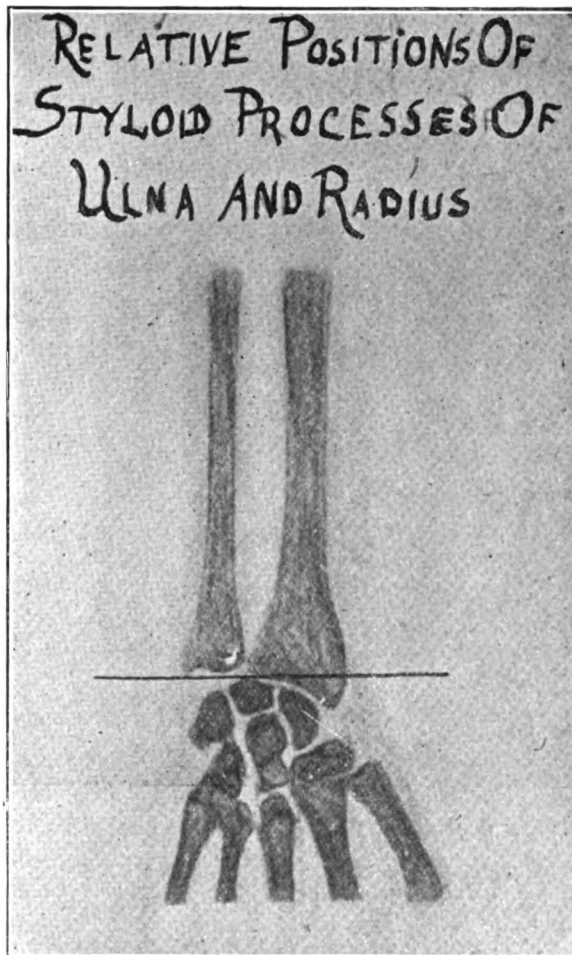
ward and outward bending and pulling. It is, of course, gratifying to have the spectators hear the grating of bone upon bone, but the motor or sensory nerve that is perhaps torn or injured, and the lacerated and stiffened tendons will not be half so much appreciated by the patient who has lost function or sensation as a result of the doctor's diligence or enthusiasm. Much needless strength is expended in the reduction of fractures and dislocations on the part of the doctor, which results only in ultimate discredit to him and in harm to the patient. Be sure of your normal surface anatomy and the distorted relations will speak a language understood at a glance. If there are not sufficient signs that can be elicited without the danger of adding injury to the part, put on a temporary splint and get the member between a Crooks tube and a fluoroscope



or have two plates taken at right angles to each other where possible, as a permanent record. Then, when sure, go ahead, slowly and gently; brute force is seldom required and can only increase what is already serious injury.

The commonest fracture, which often leaves the patient with a crippled limb, is that of Colles. This is a fracture across the lower end of the radius with a backward and outward luxation of the hand. The styloid process of the ulna may or may not be fractured. The fracture line is usually from  $\frac{3}{4}$  to  $1\frac{1}{4}$  inches above the tip of the styloid process of the radius transversely across the bone, and may vary as shown in figure 1. The deformity produced by this fracture is in direct proportion to the amount of luxation. The dorsal displacement of the lower fragment causes an elevation on the back of the arm just above the wrist and a corresponding depression on the palmar surface (fig. 2), and

This fracture is generally produced by a fall on the palm of the extended hand. The carpus acting as a solid body is pushed against the posterior lip of the articular surface of the radius, putting the anterior wrist ligaments on the stretch. As this ligament is more resistant than the bone, the hyperextension is transmitted to the radius and it fractures higher or lower, depending upon the point where the driving force from below and the lever action of the radius meet. The fall upon the palm suddenly fixes the carpus against the articular surface of the radius in full extension; the lever ac-



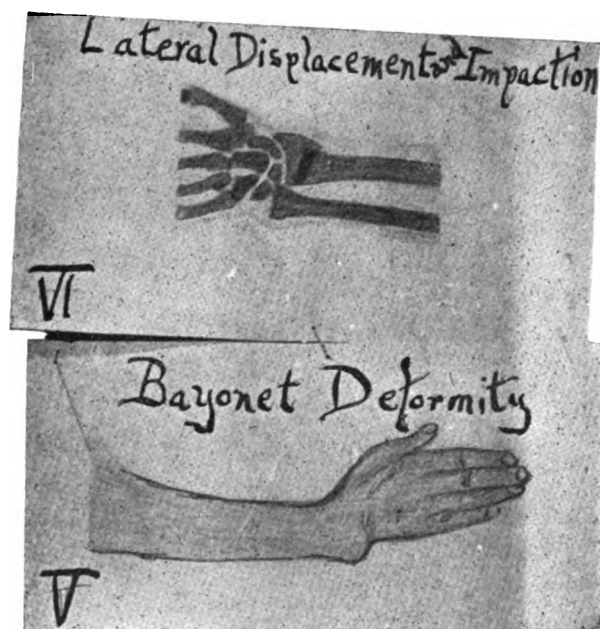
besides this, an undue prominence of the styloid process of the ulna and a disturbed relation between it and that of the radius. Normally, the styloid process of the radius is half an inch lower than that of the ulna (fig. 4). The ulna becomes unduly prominent because the hand, plus the lower fragment, is carried outward and upward, and the radial styloid process ascends with it to or even higher than the level of that of the ulna. This lateral outward and upward displacement is sometimes so pronounced as to cause the so-called bayonet deformity (fig. 5), and in these cases is usually accompanied by a tearing of the internal lateral ligament, with or without a fracture of the ulna styloid. A majority of these fractures are complicated by an impaction of the lower fragment against the posterior lip of the upper fragment (fig. 8), the extent varying with the force producing the fracture and the direction of the lines of force.

tion of the radius is continued to increase this extension; both forces meeting at the joint, the strong anterior ligament is capable of resisting this pull and the bone breaks just at or above its attachment (fig. 7). The fracture may also be produced by a fall upon the dorsum of the hand when, the forces working in the opposite direction, the displacement is, of course, on the palmar surface. In children it is not rare to find an epiphyseal separation either alone or associated with a fracture line running into the radius. After eighteen years epiphyseal separation alone does not occur.



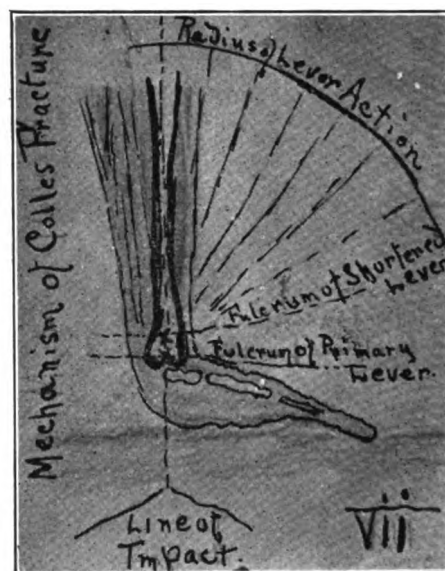
The evil after-results of this injury are directly due to the degree of un-reduction that is allowed to remain. The fracture produces a wrist increased in all its dimensions with a consequent tension of tendons and ligaments. Add to this the laceration of tendons and sheaths, the tangents at the site of fracture over which they must now ride and the formation of callus both in front and behind, and it is small wonder that deformity and loss of function is the result unless proper reduction is made (fig. 8).

Do not attempt to pull this fracture into place; you may get the lower fragment down if not impacted too hard, but you will not be able to bring it into proper lateral apposition without the employment of a great deal of force, and only by sheer luck can you properly reduce it in this manner. A

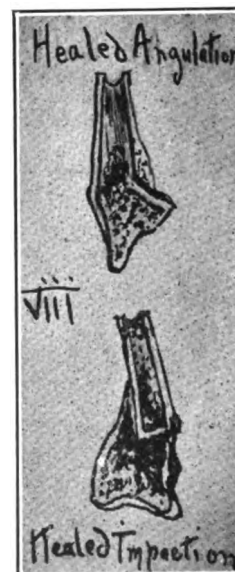


simple and always effective way, one that does the least possible damage to tissues, is to continue the lines of force that produced the fracture. Over-extend the hand; lay the back of the hand against the arm if necessary; remember that the *lower fragments is attached to the hand and moved with it*, and if the hand is extended back until the slack of the anterior ligament is taken up, then the lower fragment follows the hand, and the impaction is freed. While the hand is in this over-extended position, usually at a little more than right angles to the arm, the lateral displacement is corrected by pushing the hand to the ulnar side. This is usually accomplished with but little necessity for force. When the hand is in relatively normal lateral position, push against the lower fragment, keeping the hand over-extended, until the posterior lips of both

upper and lower fragment are in contact, then sharply flex the hand and the fracture is reduced (fig. 9). Once reduced, if the hand is kept flexed it will not easily become re-dislocated. Examine now with the fluoroscope and note the apposition;



if it is not accurate, repeat the procedure until reduction is perfect, for upon perfect reduction depends perfect function and in just that degree of imperfect reduction that we allow to persist will there be deformity and loss of function. If the tip



of the styloid process of the ulna is fractured it is easily held in place by a strip of adhesive plaster.

Any splint that holds the hand in a position of flexion will give good results. The important thing is to keep the hand flexed; this locks the lower fragment tightly in position and a disturbance of

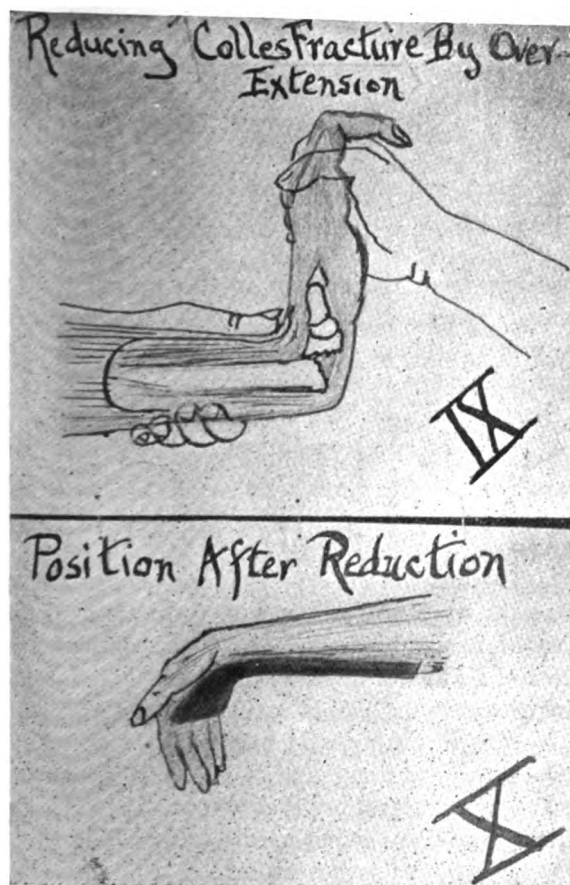
position is almost impossible. Anterior and posterior splints from the elbow to the wrist, with the hand flexed by bandaging, or the hand on Shede's anterior splint, with or without a posterior splint, makes an excellent retentive apparatus (fig. 10). From three to four weeks is usually sufficient immobilization, depending somewhat on the age of the patient. Passive motion may be begun at from two-and-a-half to three weeks. If reduction has been accurate, the result will be nearly perfect, functionally and anatomically.

The prototype of the Colles' fracture, in the leg, and one which often gives a great deal of trouble,

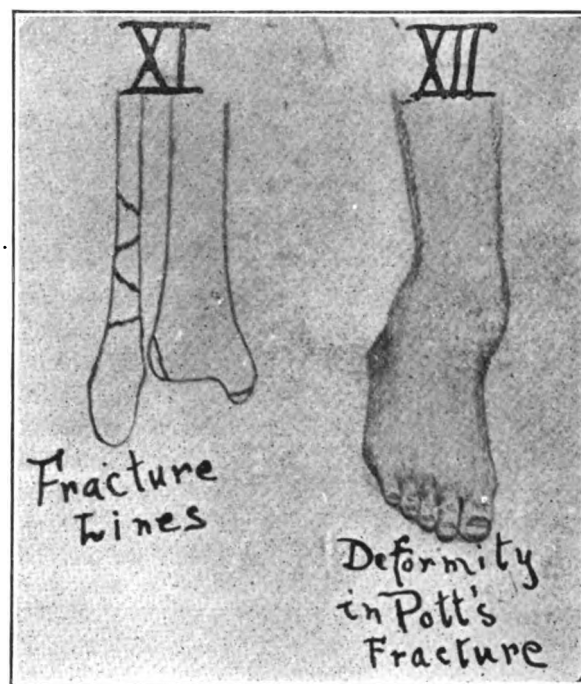
or by falling or jumping forcibly on the foot while it is inverted or everted.

If while the foot is fixed the body falls to the tibial side, or is twisted inward by misstep or jumping, the tibio-fibular and external lateral ligaments are put on the stretch, and the ligament, being stronger than the bone, tears the external malleolus off, above its point of insertion. If the force is continued in the same direction the astragalus is crowded against the internal malleolus and breaks it partly or completely off. This is fracture by inversion (fig. 15).

If the foot be fixed and the body fall outward, the internal lateral ligament is put on the stretch; it sometimes tears but more often pulls a piece off of the internal malleolus; the force continuing,



is Pott's fracture of the fibula. By this we mean a fracture of the fibula anywhere across its lower third. It may be just above the external malleolus (fig. 11). This fibular fracture may or may not be accompanied by a fracture of the tip of the internal malleolus and a corner of the external lower edge of the tibia, but usually the fibula is fractured alone with a tearing from the bone of the internal lateral ligament. This fracture is rare in children, but frequent in adults. It is generally produced by twisting the foot on uneven ground, or by falling sideways when the foot is fixed, as between gratings, rocks, in a hole, or anything that will hold it,



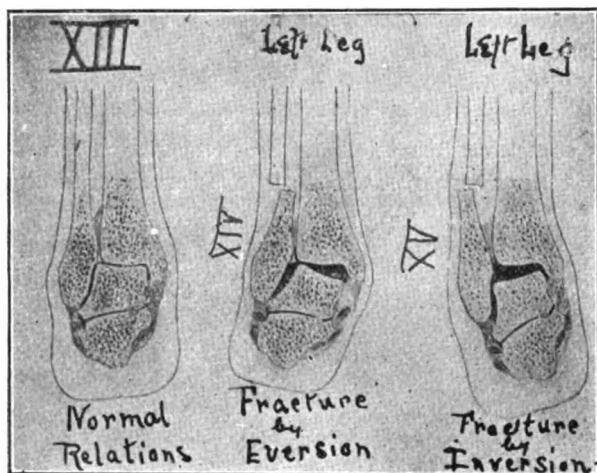
drives the astragalus and calcaneum against the external malleolus, and the weight of the body forces the leg and the shaft of the fibula inward. The entire weight of the body comes to rest on the fibula as it impinges against the astragalus and it breaks at some point in its lower third. This is fracture by eversion (fig. 14).

Thus, either by inversion or by eversion, may this fracture be produced. The tendo Achilles pulls the heel up and the foot back with more or less rotation. Proportionate upon the ligamentous tearing is the degree of luxation of the foot both backward and outward; it may be hardly noticeable or the foot may be markedly dislocated outward, as shown in figure 12.

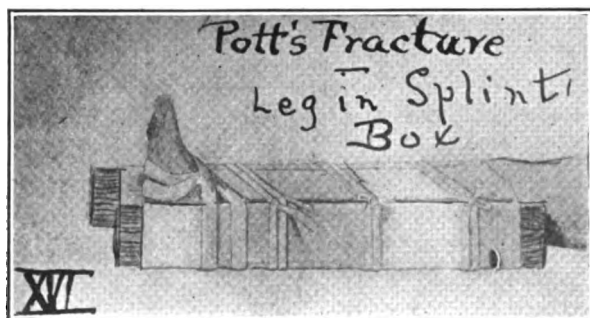
If proper reduction is made or the patient is

allowed to walk on the foot before body union is well established, the astragalus crowds the external malleolus outward and the foot is everted, and the patient walks on the inner edge of his foot or in a position of talipes valgus.

In contrast to Colles' fracture, which is difficult to reduce, but once reduced easily held in place, Pott's fracture is easily reduced, but hard to hold in reduction. To reduce, invert the foot strongly,



pushing the astragalus against the styloid process of the tibia, then strongly flex the foot, pulling it forward. In this position of flexion and inversion it must be maintained, or evil results, such as spreading of the mortise between the fibula and tibia, with consequent eversion and backward dislocation, are sure to result. Many methods have been tried and all of them are found wanting at some time. An effectual fixation of the inversion



is by several two-inch strips of adhesive plaster fastened to the outer edge of the dorsum, brought under the sole, across the internal malleolus and in a semi-spiral up on the leg; after applying which put the leg into a box splint, pad the heel well with a cotton ring pad and raise it higher than the calf, so that the leg may be crowded against the bottom of the box by placing wads of cotton on it, or better, by adhesive straps across the leg and down on each side passing through the bottom of

the box by means of slits (fig. 16). This fixes the leg in both desired positions: the spiral fixes the inversion, and the raised heel and depressed calf fixes the flexion, all of course to be reinforced by packing and bandaging. This limb may be kept here until union has taken place or until the bones are fixed, and then put into plaster. It is extremely difficult to put this fracture up in plaster and maintain the proper relations, and it is best not to try it until some union in the proper position has taken place. If the fracture is reduced in this manner and the positions of inversion and flexion are maintained, a uniformly good functional result is obtained in from six to eight weeks.

40 SOUTH STREET.

#### A NOTE ON NASAL SYNECHIAE.\*

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A nasal synechia is an adhesion between two parts of the nasal cavity. It may be fibrous, cartilaginous, or of a bony nature, and usually stretches from the septum to the lateral wall, although synechiae are sometimes found running from one turbinate to another. The size may vary from a hair line to a broad band.

Synechia can be classified as:

1. Non-fibrous.
2. Fibrous.
3. Cartilaginous.
4. Bony.

1. The non-fibrous type is found within a month after the operation causing its formation. It consists of a slight amount of young connective tissue and a number of small bloodvessels. It is of a pinkish color and bleeds easily.

2. The fibrous type is merely the result of the growth of scar tissue and is found at a longer interval after operation than type 1. It does not bleed as readily, owing to the lessened number of bloodvessels and is not as red.

3. The cartilaginous variety is usually congenital, especially if found in the young. A probe examination will distinguish between this and type 4.

4. The bony type is similar to the cartilaginous, differing only in composition.

A previous operation is generally the cause of synechia formation, but ulcerative processes, such as syphilis lupus, and nasal diphtheria, must be considered. The reaction to operative work, in the nose, whether with the galvano-cautery or from resection, is variable. Some cases form a false membrane, underneath which healing occurs and no synechiae form. Others have considerable post-

\*Read at the Clinical Meeting of the Mt. Sinai Hospital Staff, Boston, Nov. 20, 1913.

operative swelling and granulation. This results in the apposition of two surfaces. The condition, then, that is necessary for synechia formation is the two raw surfaces, either in direct contact, or separated by such a narrow space that an attempt at healing by both sides causes the affected areas to touch. This type of adhesion is almost always fibrous and is most commonly seen between the middle turbinate and the septum. The bony variety is usually found farther back in the posterior nasal cavity.

Synechiae so frequently follow operative measures where the septal and the turbinal mucus membrane, opposite, have been injured, that the utmost care should be taken, when operating on the turbinate, to protect the mucus membrane of the septum and vice-versa.

Small synechiae cause no trouble. With large adhesions the symptoms are those of nasal obstruction, headache, sneezing, coughing, asthma, inflammatory processes, and interference with the drainage of the nasal secretions.

The diagnosis can usually be made by rhinoscopic examination. In doubtful cases, the nasal tissues should be shrunk with an adrenalin and cocaine solution and a probe examination should be made.

Treatment should be undertaken only when the synechia causes symptoms, as the adhesions are often found when examining the nose for some other trouble. A more difficult problem than the permanent cure of the fibrous synechia hardly confronts the rhinologist. The adhesions, when cut, persistently reunite, and success is achieved, in most cases, only after a tedious and painstaking treatment.

Before 1894, cotton tampons and iodoformed gauze had been tried with unsatisfactory results. Then Schmidt substituted flat cardboard, but this soon becomes fetid and irritates the mucus membrane. In the same year, Dubuc employed celluloid plates, and, in 1895, Wright advised the use of gutta-percha, cut to the desired shape. In treating this condition by the interposition of a foreign body, the irritation, caused by the pressure, prevents healing. When the body is removed, healing takes place, but the synechiae reform.

In 1911, Brindel advised cauterization with chromic acid beads after a thorough separation of the synechiae. The application of the caustic was immediately followed by a nasal irrigation, made through the opposite nostril. After five or six days of non-treatment, the scab would fall off, leaving, as a rule, an indifferent result. Mauré uses mica scales, as thin as tissue paper. These can be sterilized and are elastic enough to allow the scale to be

introduced through the nasal speculum while curled up. When placed in the desired position, in the nasal cavity, its own elasticity causes it to straighten. The mica is shaped before being placed in the nasal cavity. This method, according to the discoverer, has given good results. It has the advantage of thinness, allows the nasal secretions to flow freely, and is non-irritating. All these factors are important in producing a normal healing. Denker recommends the removal of the synechiae with part of the turbinate base. For after-treatment, he inserts celluloid or hard rubber plates between the septum and the turbinate. These are removed daily for fifteen to thirty minutes and replaced until healing occurs. However, the advantage he gains by this method, namely, space, can be obtained by a more conservative procedure, and one very easily carried out. After a complete cocaineization of the turbinate, it can be fractured by exerting pressure with the long bladed Killian speculum. This gives more space between the turbinate and the septum and leaves an uninjured mucus membrane.

The use of the electrical current has given good results, but has the disadvantage of being tedious and requiring frequent sittings. The synechia is first cocaineized, then the two needle electrodes, separated by a space of less than  $\frac{1}{4}$  of an inch, are inserted about  $\frac{1}{4}$  of an inch, at the junction of the synechia and the septal mucus membrane. A current of fifteen milliamperes is applied for ten minutes and then reversed so as to allow the easy withdrawal of the electrodes. This electrical current causes a necrosis of the tissues, but must be applied a number of times, at short intervals.

If the results by these methods are not satisfactory, the synechia can be cut at both attachments, great care being taken not to injure the mucus membrane at either end. Thus a comparatively large space separates the two stumps and a reformation of the synechia is not usual. A non-fibrous synechia will almost always recur, hence it is advisable to wait until it becomes fibrous before attempting operative treatment. If the turbinate base of the synechia is so large as to leave insufficient space in the nose, it may be advisable to prepare a turbinotomy. This should be done only after the fracture treatment has been tried and found to be unsuccessful.

When the synechia is cartilaginous or bony, Kyle uses a file saw that makes a V-shaped cut. This tends to draw the tissues away from one another. When using of the above described methods, it is very important to see the patient frequently until complete healing has occurred.

## STRAIGHT DIRECT LARYNGOSCOPY, BRONCHOSCOPY AND ESOPHAGOSCOPY.

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BALTIMORE, MD.

(Continued from April Number.)

### CHAPTER V.

*Diseases of the larynx amenable to treatment through the direct laryngoscope.* In taking up diseases of the larynx amenable to treatment, the writer has thought it more practical to give illustrative cases which have been selected from his clinical work. Acute laryngitis can nearly always be diagnosed with the mirror in adults. In a patient seen some months ago a low hanging epiglottis and a sensitive pharynx prevented a view of the larynx. After hypodermatic injection of morphine and atropine and the application to the pharynx and larynx of alypin (20% solution), the small laryngoscope was passed with the head straight. The entire larynx was much reddened and thickened. The vocal cords were swollen and looked like raw beef; the false cords met on phonation; the posterior wall stood out like a pouch. Only once before, in Krause's clinic in Berlin, had the writer seen such a picture and that patient was cured by persistent treatment. The writer's patient had a specific history so a probable diagnosis of acute laryngitis, engrafted on a chronic condition, was made. Under treatment the acute inflammation gradually cleared up so that in a month he could talk with a hoarse voice. Specific treatment seemed to have no effect. He is still being treated with nitrate of silver and continued improvement seems to indicate that the diagnosis was correct. In this case the writer was particularly impressed with the great value of direct laryngoscopy. One could not have seen the larynx satisfactorily with the mirror or the pharyngoscope and a diagnosis would have been guesswork without the aid of the direct laryngoscope. The method is worth learning, however expert one may be with the mirror, for cases like the above will occasionally be met with. In children acute laryngitis is quickly and easily diagnosed by direct laryngoscopy. DeZeng's portable battery or, in houses supplied with electricity, the controller may be used as the source of light. In

all doubtful cases of acute laryngitis in children, the direct tube should be used to exclude more serious trouble. As seen through the tube acute inflammation usually presents more or less redness of the cords with absence of subglottic swelling, membrane or edema. In severe cases subglottic swelling, the so-called subglottitis laryngitis or edema, may be found and, since the diagnosis is so easily made by examining the larynx with the head straight, it should never be neglected in suspicious cases. In the small larynges of children, slight swelling may result fatally. Through the use of the direct laryngoscope, prompt and efficient treatment can often be instituted and life saved. These cases in children present the strongest argument for all laryngologists to become expert in the use of the tubes.

*Chronic laryngitis* in adults can usually be diagnosed and treated with the mirror without recourse to the tube. Occasionally, however, the tissues may be greatly thickened so that more radical treatment than applications may be needed. About three years ago a lady, 23 years of age, was referred to the writer for hoarseness of some months duration. Examination with the mirror showed peculiar reddish thickenings on the posterior wall, the vocal cords posteriorly and in the anterior commissure. Two laryngologists had made a probable diagnosis of tubercular laryngitis. The patient had multiple neuro-fibromata of the skin and, thinking there might be some connection between the two conditions, the writer sent her to a dermatologist who reported that there could be no relationship. The patient went to her home in Virginia and two months later returned greatly distressed at the complete loss of her voice. In the larynx the thickenings seemed to have increased somewhat. Through the direct laryngoscope the diseased tissue was removed as well as possible and submitted to a pathologist who reported "chronic inflammation." After repeated applications of nitrate of silver had given no relief, the patient expressed a desire to consult a laryngologist in another city. He examined the larynx, sent her to dermatologists and had x-ray pictures made and finally characterized the condition as "fibrosis of the larynx," a condition similar to the skin tumors. He expressed the opinion that if she ever recovered her voice, it would be rough and unnatural and that she would have to be removed and that eventually a tracheotomy might have to be done. On the way home the patient spent a month with her sister in Cumberland, Md. At the end of that time she appeared in the writer's office talking with her natural voice and has since remained entirely well. The case

must have been one of chronic laryngitis and the removal of the tissue and subsequent rest of the voice probably resulted in cure. At any rate the patient was well and happy. It does not happen that one has to operate often for chronic laryngitis; but in those cases with great thickening causing marked hoarseness or aphonia, the writer does not hesitate to remove the diseased tissue through the direct laryngoscope. In pachydermia which is the worst form of chronic inflammation, the thickening on the posterior wall should be removed as often as may be necessary, and here again the direct method is the safest and quickest means of operating. In advocating this treatment, the writer will probably be opposed by some of the best authorities but it has always been his policy to remove any tissue in the larynx that interferes with phonation. It seems the rational thing to do; in other parts of the body a tumor or swelling that interferes with the function of an organ is promptly removed. And certainly we should pursue the same course to restore so important a function as the voice. The argument has been advanced that it is useless to remove pachydermia because it is so apt to return; the same argument could be advanced in papillomata of the larynx but the treatment advocated for them is frequent removal in adults or children. The writer feels that the high frequency spark might be advantageously used in the treatment of pachydermia. He intends to try it at the first opportunity.

*Edematous laryngitis* in adults can usually be scarified with the mirror unless edema is marked; oxygen can be used to advantage in these cases before, during and after scarification and may tide the patient over the dangerous period. In children the larynx can be scarified at the same time that the direct laryngoscope is used to make the diagnosis. If subglottis laryngitis is present, it is not amenable to treatment through the tube. The child should be examined repeatedly with the assistance of oxygen and at the first signs of closure, intubation or tracheotomy, preferably the latter, should be done.

*Perichondritis* can be diagnosed with the mirror; in those cases with abscess formation, the direct laryngoscope should be passed and part of the abscess wall punched away through it to insure good drainage. Diseased cartilage may be removed at the same time. This treatment applies to the epiglottis since abscesses of the thyroid and cricoid cartilages usually point externally and are opened through the skin. Some years ago a woman presented herself at the writer's clinic at the Presbyterian Hospital complaining of severe pain on swallowing. Her facial expression indicated that she

was ill; her temperature on admission was 102 degrees. The mirror showed a large swelling involving the entire left side of the larynx. One could almost see the yellow reddish swelling fluctuate, and there was no doubt as to the diagnosis of abscess. The direct laryngoscope was passed after the use of cocaine and the abscess was opened with a long, straight knife. There was a gush of pus and relief was instantaneous. The patient was given cold, liquid diet and when she returned a few days later, healing was complete.

*Membranous laryngitis.* In the beginning of this disease a diagnosis can be quickly made by observation through the direct laryngoscope. After one has examined a few normal larynges, he will have no trouble in recognizing membrane through the tube. It is probably too much to say in the present stage of tube work that such an examination should be made in every case of beginning dyspnea in a child, but the procedure would add much to the attending physician's peace of mind. In making the examination the operator should be well protected as to mouth, nose and eyes. The writer generally uses a spectacle frame with very large glasses and an aluminum shield for mouth and nose attached to the nose piece which gives complete protection.

With the direct laryngoscope a differential diagnosis of simple acute, edematous, subglottis and membranous laryngitis can be made. The appearance of the membrane attached to the false cords, true cords and subglottic space, whitish or grayish in color, is characteristic. It is not possible to say from the color of the membrane whether the case is diphtheria or streptococcus infection. In diphtheria the membrane is seen attached to the same surfaces as in membranous laryngitis. If it were possible to examine these patients in the very beginning of the disease, it is probable that intubation would become a thing of the past with the prompt administration of antitoxin. By direct laryngoscopy diphtheria and membranous laryngitis can be diagnosed from spasmodic laryngitis and laryngismus stridulus.

*Tuberculosis of the epiglottis.* In cases in which the diagnosis of circumscribed tuberculosis of the epiglottis has been made, the best treatment is thorough removal through the direct laryngoscope followed by applications of formalin, carbolic acid and lactic acid. Sensation is deadened with alypin. In extensive disease the entire epiglottis may be removed with the use of a large cutting tip. The advantage over the mirror is that one sees exactly what he is doing and hemorrhage is much better controlled by direct pressure. In



tuberculosis of the posterior wall and the arytenoid cartilages, one should not hesitate to operate through the tube and to remove as much diseased tissue as may be necessary. In patients with painful deglutition curettage is the best method of treatment often relieving pain as if by magic. Ulcers are best treated by biting them out and applying formalin later. All these operations are, of course, dependent upon mild symptoms or quiescent lesions on the part of the lungs. When active symptoms are present, no operation should be attempted unless pain is so great as to endanger life from starvation. Some years ago the writer was consulted by a man, 30 years old, for some pain on swallowing and a husky voice. No general symptoms such as cough, expectoration, night sweats or temperature were present. While the patient was rather frail as to physique, he had no difficulty in doing his work as an electrician. Examination with the mirror showed infiltration and ulceration of the left border of the epiglottis with some thickening of the posterior wall. Before attempting any treatment of the larynx, the writer advised examination of the lungs; the patient consulted Dr. L. P. Hamburger, who, after two examinations, could find nothing suggestive of tuberculosis. It was impossible to examine for tubercle bacilli since there was no expectoration. The writer then proceeded to remove the infiltration and ulceration of the epiglottis and the thickening of the posterior wall through the direct laryngoscope. After the operation it looked as if all diseased tissue had been removed. Dr. J. L. Hirsh examined the tissue making a number of sections through the different specimens. He reported the presence of giant cells and tubercle bacilli which left no doubt as to the diagnosis. After a few applications of lactic acid the wounds healed, the voice cleared up and the patient was apparently well. After healing, the epiglottis showed where the tissue had been removed. The patient was advised to change his vocation and to live in the open air; he soon began to gain in weight and at this time, four years after his infection, looks the picture of health. This case has never been reported as one of primary laryngeal tuberculosis because such cases are so extremely rare but clinically it was one.

In 1911 the writer was consulted by a lady who, shortly after the birth of her baby in the latter part of 1910, developed pulmonary tuberculosis. She responded to treatment, the lungs becoming quiescent. In February, 1911, her voice became husky. With the mirror the posterior wall showed a thickening which was evidently the cause of the

huskiness. Under alypin anesthesia the thickening was removed through the direct laryngoscope with the head straight. Applications of lactic acid were then made with the result that healing took place and the voice became normal. The patient remained well until September, 1911, when she developed intestinal symptoms which proved to be tubercular and resulted in death in November of that year. In the case of a man with a large tubercular ulcer of the left false cord causing severe pain on deglutition, curettage through the direct laryngoscope followed by cauterization resulted in complete relief of pain. In this patient pulmonary symptoms were active but it was thought better to operate than to see him starve. The best method of applying the electric cautery is through the direct laryngoscope; the treatment of tubercular lesions with the cautery has opened up a new field for therapy.

*Singer's nodules.* These tumors are best treated by removal through the direct laryngoscope. With the mirror it is impossible to remove such small growths without danger of injuring the vocal cords. Under alypin anesthesia with the small tube and the head straight, it is comparatively easy to bite off the top of the nodules so that the shrinkage of healing makes the cords smooth. Since the tumors are situated at the junction of the anterior and middle thirds of the cords, it is obvious that one must use a tube which will expose the anterior commissure without force since the hand must be steady to operate without injuring the cords. With a large tube this is impossible. One should use a small straight cutting tip which will cut along the surface of the cord and not a pointed one to attempt to pick off the nodule. After thorough anesthetization the laryngoscope is passed and the forceps introduced down to the nodule; the blades are opened to cut from the side and not at the point. The inner point is shaved off and the remainder shrivels up. The opposite nodule is then treated the same way. If one is skilled in direct laryngoscopy, the rest cure is never necessary in singer's nodules. The tip which the writer uses is made by Pfau; it is a tiny instrument and works perfectly with his universal handle. Three years ago a young lady consulted the writer for slight hoarseness which prevented singing. She had singer's nodes and when they were removed as above described, her voice cleared up permanently. The removal of the nodes is probably the most difficult operation through the direct laryngoscope but the writer considers it easier than the simplest operation with the mirror. Fibromata on account of their size are easily removed through the direct

laryngoscope. The writer makes it a rule to apply the high frequency spark to the site of every tumor after removal. Since these tumors are often situated in the anterior part of the larynx, it is necessary to use a small tube to expose them properly.

Papillomata are by far the most important benign tumors of the larynx in both adults and children in whom they are nearly always multiple, frequently closing the larynx and endangering life and recurring again and again after removal. In adults they sometimes recur in the young and undergo malignant degeneration in the old. Some laryngologists claim that they are always the precursor of malignancy in the old but there are undoubtedly cases of benign papillomata after 60 years of age. Before the introduction of the direct laryngoscope, multiple papillomata were among the most serious cases the laryngologist encountered. Because of the difficulty of seeing the child's larynx, the diagnosis was often guessed at. Even when the tumors could be seen, the treatment often in vogue was a tracheotomy, the canula being worn in some cases several years until the growths disappeared. In the meantime the child was subjected to all the dangers of the chronic tube wearer. In some cases the wearing of the tube caused granulations to spring up in the trachea with a resulting stricture after the removal of the tube. A few laryngologists performed laryngotomy for the removal of the growths but the operation did not meet with popular favor because of the traumatism to such a small larynx. With the introduction of the direct laryngoscope the treatment was placed on a rational basis. The writer has no hesitancy in saying that laryngotomy is never and tracheotomy seldom required in these cases. If the patients are gotten in time, before dyspnea or cyanosis develop, they can all be cured in a comparatively short time. The writer wishes to emphasize the importance of treating all papillomata of the larynx with the high frequency spark, which, properly used, has the power of destroying the growths quickly and permanently. It is easily applied and does not injure normal tissue except by prolonged contact.

About a year ago Dr. A. M. Shipley referred to the writer, a boy, 19 months old, for aphonia and cyanosis which was particularly noticeable on crying. At the University Hospital he was wrapped in a sheet and examined with the head straight on the table and steadied by a nurse. The small tube was introduced and the larynx being exposed, was found filled with multiple papillomata some of which were at once removed with Pfau's cutting forceps. The patient was then taken to the Presbyterian Hospital

for treatment with the high frequency spark which caused the tumors to melt away so rapidly that in three months, the patient was discharged cured. The spark used was about one-fourth of an inch long and was applied directly to the tumors through the tube. Up to this time there has been no recurrence. In August, 1912, a female, 69 years old, was referred to the writer by Dr. W. F. Downes for shortness of breath on exertion. Examination with the mirror showed a large tumor, covering the glottis, leaving a small opening posteriorly for breathing. The epiglottis hung so low it was impossible to see the origin of the growth. The patient was immediately examined with the small direct laryngoscope and when the epiglottis was pulled forward, it could be seen that the tumor arose by a broad base from the right inferior surface of the epiglottis. A large part of the mass was at once removed with Pfau's cutting forceps. Hemorrhage was profuse and the patient was put to bed for 24 hours. Dr. H. J. Maldeis, the hospital pathologist, reported that the tumor was papillomatous in character with two points of suspicious in-growth. The following week the high frequency spark, one-fourth of an inch in length, was applied to the base of the growth. Two weeks later the patient returned and it was impossible to tell whence the tumor had sprung. Up to this time there has been no recurrence.

About a year ago a male, 37 years old, consulted the writer for hoarseness which was almost raucous in character. On examination of the larynx a tumor was seen directly in the anterior commissure with attachment below the cords in the subglottic space. On phonation the growth would rise and insert itself between the cords causing hoarseness. Under local anesthesia with the head straight the small tube was introduced; the anterior commissure was exposed and the tumor was removed in two bites of a curved biting tip. The voice returned at once. Microscopic examination showed a fibromyxoma. The ease of removal from the anterior subglottic space would have convinced anyone of the superiority of the direct over the indirect method.

The next case illustrates the value of the direct method when the mirror fails. A male, 30 years old, consulted the writer for hoarseness of a year's duration. Three years ago he had a papilloma removed from the left vocal cord by the indirect method. For two years his voice was normal; then hoarseness developed which gradually grew worse. Examination with the mirror was not satisfactory because of a low hanging epiglottis and a large

uvula. A small growth was seen which was thought to be on the left vocal cord. The same afternoon the larynx was anesthetized with 20% alypin solution and the small tube was passed with the head straight. When the larynx was exposed the small growth on the left was seen below the vocal cords while on the opposite side there was a large tumor covering the true and false cords; in the anterior commissure was another growth. With Pfau's forceps the papillomatous tissue was soon cleaned out and the false and true cords exposed. In another patient who had three operations for papilloma of the left vocal cord by the indirect method, the small tube was passed with the head straight and the tumor successfully removed so that there has been no return. Papillomata in children are so important on account of the small larynx and the difficulty in treatment, it may not be amiss to go into the treatment through the direct laryngoscope which has been successful in the writer's hands. In the beginning it is well to repeat that anesthesia, local or general, should never be used in young children. It is far better to operate without anesthesia than to subject a child to its dangers. The little patient is held on the table with the head straight as above described. The small tube is passed between the incisor teeth and the larynx quickly exposed. When the papillomata are seen, Pfau's cutting forceps are passed through the tube and as much of the growths cleared out as possible. By working carefully normal tissues are not injured. If bleeding obscures the view, adrenalin chloride, 1 to 3000 is used. A small copper wire, attached to a fulguration outfit, is now passed and the high frequency spark about one-fourth of an inch long is applied to the bases of the growths. If the masses are extensive, almost closing the larynx, the patient is kept in the hospital a day or two. With this treatment most of the papillomata can be destroyed at one sitting. One week later the treatment is repeated and so on until the patient is cured. It makes no difference how small the throat is, the small tube can be successfully used. If direct laryngoscopy had made possible nothing else than the successful treatment of papillomata in children, its fame would be safe for all time. With this treatment papillomata can now be cured in a few weeks while the old methods required months or even years. Fulguration is much more difficult to use with the head in extension over the end of the table. The writer is convinced that if this method of treatment is generally adopted, tracheotomy would be done rarely. No laryngolo-

gist would think of advising a laryngotomy and yet the writer has recently heard of a case in one of our leading hospitals in which a surgeon—not a laryngologist—did the operation, scraped the papillomata and surrounding tissue thoroughly with a curette and sewed up the larynx. The wounded surfaces promptly grew together causing complete stenosis of the larynx; the patient is wearing a tracheal canula and the surgeon is wondering how she will get rid of it. With modern methods of treatment such a termination would be impossible. In these cases of papillomata in which dyspnea and cyanosis are marked, it is better to do a tracheotomy because these symptoms show almost complete closure of the larynx and the operation gives one a chance to clean out the growths. In a short time the canula can be permanently removed. Laryngologists must impress upon parents and the public generally, the importance of examining the larynx in adults and children when hoarseness persists for any length of time. If children can be treated in the beginning of papillomatous growths, there will be no tracheotomy.

In malignant growths the writer does not advocate any intra-laryngeal operation. But in cases of doubtful diagnosis direct laryngoscopy assumes an important place as regards removal of specimens for microscopic examination. With various cutting tips it is possible to cut as deeply as may be desired. To work with certainty, however, one must have the head straight to secure muscular relaxation and must use a small tube. Then it is no more difficult than removing tumors. A letter from a fellow laryngologist in another city may be interesting as bearing on this point. He says: "I had three months ago the chance to remove by direct laryngoscopy with your position a carcinoma of larynx invading the right vocal cord above anteriorly, partly also the ventricle Morgagni and region below the vocal cord (about a big hazelnut) in such a successful way that the voice is completely restored, no recurrence is visible and the vocal cord is restored."

The writer does not advise such operations in malignant growths but if one decides on intra-laryngeal interference, he will certainly find the straight position of the head and the small tube the easiest and best method of operating.

In recurrent paralysis of a vocal cord the diagnosis can usually be made with the mirror. If, for any reason, the larynx cannot be seen, the diagnosis can be made with the direct laryngoscope. So little force is used in holding the epiglottis forward with the small tube that the patient has no trouble

phonating; the paralyzed cord in the middle line and the other cord moving over to meet it are easily seen and the diagnosis established. In the treatment one can apply the electrode directly through the tube. Under this heading it is interesting to note that Brunings has introduced a new method of treating old paralyses of the vocal cords. Since all the readers of this monograph may not be able to read it in his book, the writer will copy his description of it. He says: "The endolaryngeal 'plastic' with hard paraffin aims at achieving the direct opposite of dilatation, *i. e.*, at diminishing pathological widening of the larynx, which prevents proper closing of the glottis. Up to the present time I have only employed the method to overcome the phonetic and respiratory disturbances produced by one-sided recurrent paralysis, but have obtained such remarkable results that a short description of them may be given here. Disabilities which remain in the cases of old compensated one-sided recurrent paralysis are to be attributed to weakness and atrophy of the paralyzed vocal cord. This condition not only results in a defective closure of the glottis, and consequent incapability of energetic coughing, but leads to an excessive expenditure of air in speaking, so that the voice becomes weak and usually hoarse, and inclined to go into falsetto. The pitch of the voice is also in most cases too high, owing to the compensating hypertrophy of the other vocal cord and of the strong innervation necessary for the overcrossing. I have therefore made an attempt to restore the normal phonatory position to the limp atrophic vocal cord by means of injection of hard paraffin. As the vocal cord movements occur in a transverse direction, it was to be expected that the plastic might result, not only in the restoration of the respiratory closure of the glottis but also in the removal of the phonatory disability.

"The apparently difficult technic of the vocal cord plastic may be easily learned with the help of counter-pressure autoscopy. For it I use one of the ordinary screw syringes for hard paraffin, on the end of which a canula about 18 centimetres long by 1 millimetre wide is fixed. At the end of this canula there is a fine, short, bent, bayonet-shaped needle soldered on. The syringe holds 2 c.c. of hard paraffin of 42 to 43 degrees melting point. To carry out the plastic, the paralyzed side of the larynx is presented by means of counter-pressure autoscopy from the opposite side of the mouth, the lamp being in the high position. Injection is performed best, at the first sitting, in three places, the two outer of which are close to

the anterior and posterior end of the vocal cord. The puncture should be made midway between the free edge of the vocal cord and its lateral limit. Each of these pieces receives about  $\frac{1}{6}$  to  $\frac{1}{4}$  c.c. of hard paraffin, according to the varying individual circumstances. The assistant who is checking the screw syringe should count the revolutions aloud in order to be able to reckon the injected dose accordingly. The determination of the proper depth of puncture offers no very great difficulties. If the puncture is too deep, the paraffin is seen at once in the subglottic space. The needle is then slowly drawn back during the further injection, in order to distribute the paraffin over the whole thickness of the vocal cord. The fear, also, lest the injection might produce separate protuberances at three places has proved to be groundless, as the intervening spaces are apparently equalized by means of reactive cellular activity. I have never seen any considerable degree of edema after the injection, but it is well to make the patient spare the voice for two or three days. After this, phonation exercises should be commenced with as deep a voice as possible, and with all possible economy in using the expired air. Slight inflammatory reactions, which may occur in the first days, produce no disturbance. I have up to the present time treated seven patients by this new method, and as most of the cases were of old standing (half to two years), the maximum atrophy had set in, and spontaneous improvement was no longer to be expected. The result was in three cases quite surprising, and the respiratory disturbances were also completely removed in the four other cases. The patients were able in a few days after the injection to speak and cough in a normal manner, and the voice weakness and the phonatory expenditure of air had improved even to the point of completely disappearing. On the other hand, the voice acquired a strong, but in singing, a somewhat rough sound. In each case the patients were entirely satisfied with the result of the treatment. It seems advisable, according to present experience, not to inject more than  $\frac{1}{2}$  c.c. Should the correction be found to be still insufficient after eight days—that is to say should the vocal cord not be in the median line—a second injection may be made. With regard to the duration of the results, I am unable at present to judge; my longest standing case has remained without change for more than half a year. It is possible, according to results which have been obtained otherwise with paraffin plastic, that the injection would require to be repeated after some years. Hitherto I have only performed the injections in a direct manner, and

they offer no difficulties in cases where the conditions of autoscropy are not too unfavorable. The indirect procedure would here be extremely uncertain."

The writer wishes to say that with the straight position of the head and the use of the small tube, he considers all cases favorable for direct laryngoscopy. He cannot imagine a case in which, with patience and perseverance, the larynx could not be examined. He has repeatedly performed both simple and difficult operations through the small tube and is therefore in a position to say that an apparatus to force the larynx back, such as is exemplified in Brunings' counter-pressure instrument, is never necessary in direct laryngoscopy. He thinks he can also say with certainty that general anesthesia is never necessary in direct laryngoscopy except in older children who cannot be held and in certain nervous cases such as chorea.

*Stenosis of the larynx.* In the treatment of stenosis of the larynx, direct laryngoscopy occupies the first place. It gives the means of seeing exactly how much of the larynx is closed and of cutting through the cicatrized tissue as no other method can. The writer's method of procedure in these cases in adults is to examine first with the mirror and then to use direct laryngoscopy, with the knife ready to cut through the diseased tissue. If the stenosis is complete, the patient is already wearing a tracheal canula. In such cases the cicatrix is immediately cut through in the middle line with no attempt to save the vocal cords because they are usually so tied up in the cicatrix as not to be visible. The opening is then dilated until a large intubation tube passes easily. The tracheal canula is removed and a forceps passed through the tracheal wound to clamp the lower part of the intubation tube; a hard rubber piece is then screwed on the handles of the forceps to hold the tube permanently in the larynx. This apparatus was devised by Dr. John Rogers and, in the opinion of the writer, is the best method of treating stenoses. The tube is removed from time to time, cleaned and replaced. In children the treatment is carried out with the patient flat on the table and the head straight. The small tube is passed, the operation performed through it, if necessary, and Rogers' apparatus applied. In practically all cases the bowl of the intubation tube will be too large for the patient, adult or child, to swallow comfortably and it must be shaved down considerably. One of the writer's patients has worn his tube six months without extubation and breathes as easily as when it was first put in. The writer prefers this treatment

to laryngostomy, the after treatment of which is usually more or less painful. In children the tube must be removed every two or three weeks because the small tube stops up with thickened secretion.

Some years ago a girl, 6 years old, was brought to the writer from Cumberland, Md., with the history of difficult breathing for six months. She was examined with the head straight on the table and, on exposing the larynx, a membrane which resembled cuts of congenital web was seen between the anterior two-thirds of the vocal cords allowing a small space posteriorly for breathing. Since the membrane appeared thin a successful attempt to break through it with a six year intubation tube was made. The patient wore the tube two weeks at the end of which time it was removed, cleaned and replaced. The mother took the child home and, instead of bringing her back in a month, as she had been instructed to do, returned in two months. On the removal of the tube the direct laryngoscope showed the larynx clear and, since the voice was practically normal, the patient was discharged as cured.

In January, 1912, Dr. R. A. Warner asked the writer to see a child, 2 years old, at the Sydenham Hospital who had been intubated for diphtheria and had worn the tube five days; during convalescence dyspnea developed and grew gradually worse until the breathing could be heard over the room. The little patient was examined with the direct laryngoscope with the head straight. Exposure of the larynx showed a large subglottic mass springing from the left wall of the larynx and almost closing the lumen. The patient was immediately intubated with a one year tube and taken to the Presbyterian Hospital for observation and treatment. That afternoon she coughed the tube up; an attempt to pass a two year tube failed so the first tube was replaced. That night she again coughed the tube up and was hurried to the writer's office in a taxicab gasping for breath and markedly cyanotic. She was intubated at once and taken to the hospital where the writer did a tracheotomy with the intubation tube in the larynx. When the trachea was entered, the tube was pushed up. The patient recovered promptly and a few days later Rogers' apparatus was adjusted. It was removed every two weeks and the larynx examined directly. It was interesting to watch the disappearance of the pathological mass from fortnight to fortnight. It slowly melted away and in May the larynx appeared normal so that the apparatus was removed permanently. The child has remained well with a normal voice.

In April, 1912, Mr. B., 26 years old, was referred to me by Dr. Murphy of Wilmington, North Carolina. In July, 1911, he was stricken with typhoid fever and during convalescence developed dyspnea which grew gradually worse until tracheotomy was necessary. When the writer saw him he had worn his tube about six months. Examination with the direct laryngoscope with the head straight showed complete closure of the larynx except posteriorly where a small probe passed through. To relieve the stenosis, the larynx was cut through with a long knife introduced through the direct laryngoscope, care being taken to cut in the middle line. The vocal cords were tied up in cicatricial tissue so no attempt was made to save them. The opening was then dilated until a large intubation passed through. Rogers' apparatus was then applied and the patient allowed to go to his home in South Carolina where he has had charge of a large saw mill. He is well and his only inconvenience is his voice which is a whisper.

One of the few cases which the writer was compelled to examine under general anesthesia was a deaf mute, who, one month before, fell and struck his larynx on a wheelbarrow. The attendant noticed, a few days later, that he had lost his voice entirely and was breathing hard. The dyspnea increased rapidly so Dr. J. J. Carroll asked the writer to make a laryngeal examination. The patient was affected with chorea and the attempt with the direct laryngoscope not only failed but caused such labored breathing that the trachea had to be opened under local anesthesia with the patient sitting. A few days later he was given ether through the tracheal canula and the larynx examined through the direct laryngoscope with the head straight on the table. The anterior part of the larynx was closed with cicatricial tissue which was opened through the tube and Rogers' apparatus applied. The patient wore the tube until the middle of September at which time he was put to sleep and the larynx examined again directly. Healing appeared complete so the tracheal canula was introduced and the patient kept in the hospital for observation. The next morning he pulled the tube out and, two hours later, when he was found, the resident physician was unable to replace it. He developed no untoward symptoms and a few days later was allowed to return to the asylum. Though syphilis is said to be the chief cause of stenosis of the larynx, all of the writer's cases except one have been due to other causes.

*Foreign bodies in the larynx.* Foreign bodies in the larynx are rare. If a large object lodges in the

glottis, asphyxiation usually results before a physician can be called; if small it is apt to slip between the cords into the trachea or bronchi. The writer has seen only one case of foreign body in the larynx and it was strange that the child did not suffocate. A little girl, 2 years old, while eating soup, swallowed a bone which caused violent coughing and cyanosis. The symptoms subsided and, aside from occasional cough and loss of voice, she was in fair condition. A specialist attempted to remove the bone which he thought he located in the larynx. As was to be expected the mirror failed in such a small throat. He then brought her to the writer for direct laryngoscopy. At the urgent solicitation of the parents and against the writer's better judgment, chloroform was administered. With the head straight the small tube was passed and, as soon as the larynx was exposed, the bone was seen wedged in the glottis. The foreign body was seized with Pfau's forceps and removed by exerting some force on the instrument. To the eye there seemed no space left for the patient to breathe through. The bone was swallowed Sunday and was removed Thursday afternoon. The patient made an uneventful recovery. In this case a general anesthetic was dangerous and should not have been given. Never again will the writer allow the pleadings of the parents to overcome his better judgment. It is not necessary to emphasize the ease with which foreign bodies can be removed from the larynx with the head straight.

*Pemphigus of the larynx.* A short time ago at the request of Dr. Hiram Woods, the writer examined a boy, 9 years old, who had pemphigus of both conjunctivae. His voice became husky and he had difficulty in swallowing solid food. The boy was wrapped in a sheet and examined with the small tube with the head straight on the table. When the larynx was exposed, both cords were found somewhat thickened and on the posterior wall was a white swelling similar in appearance to a swelling on the conjunctiva of the left lower lid. The disease was evidently an extension of the pemphigus to the larynx. No treatment was attempted but the larynx will be watched and if closure threatens, Rogers' apparatus will be introduced. The description of the changes at the upper end of the esophagus will be reserved for another chapter. Only one other case of pemphigus of the larynx has come under the writer's notice; in Krause's clinic in Berlin, he saw a distinct bleb on the epiglottis.

A few days ago a little patient, 14 months old, was referred to the writer by Dr. Lee Cohen whose



direct laryngoscopes were too large to allow a satisfactory view of the larynx. The child had had a peculiar crowing sound in breathing since birth. After exercise the sound was louder and the mother was becoming alarmed though there was never shortness of breath or cyanosis. The patient was examined with the small tube with the head straight on the table. When the larynx was exposed, the tissues seemed a little thickened but not enough to account for the noisy respiration. The vocal cords did not seem to open as well as perfectly normal cords and it was not possible to get a good view of the subglottic space. In view of the negative findings no treatment was recommended but the larynx will be examined from time to time as a precaution.

Just to show that the straight method is as easy in young babies as in older children, the writer wishes to cite a case which he saw some years ago at the Garrett Hospital at the instigation of Dr. J. Staige Davis. A little patient, 11 months old, was intubated for diphtheria and during convalescence, developed dyspnea which gradually increased. At the examination a subglottic stenosis was found. Despite the small larynx no difficulty was experienced in the examination.

*The safety of direct laryngoscopy.* The writer considers direct laryngoscopy absolutely safe under normal conditions. Even when the contraindications are present, such as arterio-sclerosis, dyspnea, etc., the use of the small tube and the straight position of the head make the method practically safe. The writer does not hesitate to examine any case in which he thinks direct laryngoscopy may be of help.

*The practicability of direct laryngoscopy.* When one becomes expert with the tube, he can examine the larynx almost as quickly as with the mirror. Five minutes is a fair estimate and one is well repaid for the direct vision. A great advantage is that an operation can be immediately performed. The difficulty of examining children with the mirror makes direct laryngoscopy indispensable in this class of cases. With the method described above, one can examine the child's larynx in two minutes without pain or traumatism.

*Anesthesia in direct laryngoscopy.* Anesthesia was taken up in a general way in Chapter 11 but it is a subject of such importance that a few words here may not be amiss. If cocaine is used, a 4% solution should be brushed over the wall of the pharynx and the epiglottis with a curved applicator. After waiting two or three minutes the laryngoscope is introduced, the epiglottis pulled forward

and a straight applicator, holding a 10% solution is applied to the larynx. In a few minutes the larynx is sufficiently deadened to proceed with the examination. If an operation is necessary, more cocaine may have to be used. This drug must be used cautiously for one never knows when he may strike a patient with an idiosyncrasy for it. Two years ago the writer used a small quantity to anesthetize the larynx and trachea for a bronchoscopic examination. The patient felt perfectly well after the examination and was allowed to leave the hospital. He took a car and, after leaving it, went into a restaurant to get supper. He remembered nothing after paying his bill. At 10.30 o'clock that night he was arrested for drunkenness and, after a hard fight with two officers, was taken to the station house where he had to be forcibly held to prevent his doing himself bodily harm. At 1.30 o'clock in the morning, after he had quieted down somewhat and it was learned that he was suffering from cocaine poisoning, he was taken to the University Hospital where under the influence of sedatives, he gradually recovered. At 9.00 o'clock A. M. when the writer saw him, he was rational but remembered nothing that had happened the night before. At 2 o'clock P. M. he was nervous and excited and upon inquiry it was found that he had been given atropine. This was stopped and that night he was in good shape except for weakness. He afterwards told the resident physician that the application of a belladonna plaster would poison him. This case is cited to show how dangerous cocaine may be; the writer believes every patient should be questioned before the use of the drug as to possible idiosyncrasies. Since this experience the writer has used no more cocaine. His method of anesthetizing the larynx now is as follows: The pharynx and epiglottis are brushed over with alypin or novocain solution (20% solution). After waiting two minutes the tube is introduced and a solution of the same strength applied to the larynx. This suffices for an ordinary examination. If an operation is necessary, the same solution is applied to the vocal cords. If, perchance, a general anesthetic is needed, the writer's preference is ether preceded by a hypodermatic injection of atropine. In children no anesthetic is used for examination or operation. Cocaine is dangerous and they are so easily held on the table that no anesthetic is necessary. Formerly all adult patients received a hypodermatic injection of morphine and atropine, but this has been discarded as unnecessary. In a book on diseases of the larynx published comparatively recently, the following is found: "Inspection

of the larynx is difficult in the young child but is usually possible if he is firmly secured in a blanket and held in a nurse's lap. It is not possible to hold the tongue in the ordinary way so that Bleyer's or Escat's depressor must be used. The chief difficulty is that mucus and froth obscure the view; but this may be greatly diminished by the use of cocaine which must, however, be applied with caution in children; general anesthesia is sometimes necessary. Killian's tubular speculum is especially valuable for children. Lately Killian has introduced a tubular speculum which is of great value for certain cases, such as the removal of papillomata in children. It is necessary that the head be bent very far back and usually a little to the right side so that the speculum may be in the left angle of the mouth. In adults the tube may be passed with the patient in the sitting posture under thorough local anesthesia; but in children, at any rate, a general anesthetic is necessary, the patient being placed in the lateral position or on the back the head hanging over the end of the table." The writer mentions these views simply to condemn them. General anesthesia in direct laryngoscopy in children increases enormously the dangers and no expert at the present time would use it. As mentioned above it should be reserved for the few adult patients who through nervousness or other cause will not permit examination under local anesthesia. Children can be so easily handled without local or general anesthesia that it would be a waste of time to use either.

(To be continued.)

#### TUBERCULIN IN THE DIAGNOSIS OF OBSCURE CONDITIONS IN THE GENITOURINARY SYSTEM.

If the tuberculin reaction is focal, as I have repeatedly seen in renal tuberculosis, one starts the operation with a well-considered plan, knowing just what one has to do. Exploratory inspection of a kidney in the early stages of tuberculosis is a most unsatisfactory method of diagnosis, and frequently leads to mistakes, and just in this type of case one may be fortunate enough to clear up the diagnosis with tuberculin by obtaining a focal reaction. If this fails the exploratory operation will be in order. . . . I do not use the tuberculin test without first carefully studying the case under consideration. I make it a rule to employ every available means of diagnosis before resorting to the use of tuberculin. When the diagnosis can be made without tuberculin, which is the rule rather than the exception, I make no use of this preparation. Moreover, in patients with advanced tuberculosis in the lungs or other parts, I would not use this poison.

—EDWIN BEER in the *Medical Record*.

#### OVARIAN GESTATION.

Being principally a review of the literature.

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The statement that fecundation of the human ovum normally and almost invariably occurs within the lumen of the Fallopian tube has been so frequently and repeatedly reiterated in textbooks and elsewhere that correctness of the observation is seldom seriously questioned. The fundamental proposition has apparently been ignored or overlooked that, if this were literally true, in the nature of things there would be but few normal intra-uterine pregnancies followed by natural delivery, i. e., nearly every gestation, from beginning to end, would almost necessarily be of the ectopic variety!

While obviously the purpose of the tubal ciliated epithelia is to assist migration of the unimpregnated ovum toward the normal place of fecundation (the uterine cavity), it appears equally obvious that an ovum fertilized in the outer one-third of the ductus Fallopius could seldom reach its ultimate destination, because of (a) the rapidity of development of the products of conception, and (b) the disproportion of the tubal lumen near the uterus as compared with the outer extremity.

In thus criticising current professional opinion the pertinent facts have not been overlooked, (a) that normal spermatozoa may survive with unimpaired vitality and motility many days (exact period undetermined) within the cervix, and the uterine cavity, (b) that not infrequently they enter the lumen of the Fallopian tube and there fertilize the ovum, (c) that they occasionally traverse the entire length of the tube and impregnate the ovum before its liberation from the Graafian follicle. However, prevailing impressions to the contrary notwithstanding, it is desired the dicta be emphasized that (1) in the *genus homo femininis* at least fecundation normally takes place only within the uterine cavity, that (2) whenever the ovum becomes fertilized elsewhere the occurrence should be regarded as accidental and abnormal.

Although medical history clearly indicates the fact that ovarian gestation was at least microscopically recognized early in the seventeenth century, and while subsequent gynecological literature details examples thereof demonstrated beyond peradventure by histological investigation, there were those of high professional standing who continued to seriously question the possibility of its occurrence, i. e., the hypothesis was disputed that it was possible for the ovum to become fertilized before its liberation from the Graafian follicle. Foremost

among these was the illustrious Bland-Sutton who (prior to 1901) remarked that he was convinced from his experience and observation that primary ovarian gestation had no existence; Lawson Tait contended that extra-uterine pregnancy was never ovarian, but always tubal; Kelly and many others claimed ovarian gestation must be exceedingly infrequent because never encountered in their experience, and the possibility thereof being so remote it might as well be entirely ignored; as late as 1905 Wathen declared "ovarian pregnancy is so infrequent as hardly to be worth considering, and but few authenticated cases are on record."

During the period when the existence of ovarian gestation was thus vigorously disputed, details concerning celiotomy for ruptured extra-uterine pregnancy, pelvic hematocele, peritonitis, pelvic cellulitis, ovarian hematoma, "blood-cyst" of the ovary, ovarian apoplexy, etc., were commonly recorded in gynecological literature. Evidently it did not occur to the distinguished operators that in the majority of instances the so-called "blood-cyst" of the ovary, pelvic hematocele, ovarian apoplexy, "rupture of the ovary," could be legitimately included in the classification of ovarian hematomata, the origin of which might more often than otherwise be ovarian gestation!

On the other hand, however, although accurate ante-operative diagnosis for obvious reasons remained impracticable, long before 1901 German writers frankly admitted the possibility of ovarian gestation, and while several examples had previously been demonstrated following celiotomy or necropsy, Spiegelberg (1878) was the first to formulate definite indications, the fulfillment of which he claimed must be assured to establish a positive anatomical diagnosis, viz.:

- (1) That the Fallopian tube must be intact and have no organic connection with the gestation sac:
- (2) That the gestation sac must occupy the position of the ovary, and be connected with the uterus by the ovarian ligament:
- (3) That definite ovarian tissue must be found in the sac wall.

While it is admitted that the foregoing criteria are important from the viewpoint of positive anatomical diagnosis, unless celiotomy be undertaken during the first few weeks of the gestation, fetal development may have so altered or destroyed normal topographical relationship as to render accurate diagnosis impracticable. Particularly is satisfactory diagnosis impossible, even after careful histological investigation, if celiotomy be long delayed, e. g., in not a few instances has necropsy

demonstrated that long-standing lithopedios most likely owed their origin to ovarian rather than tubal or abdominal gestation, there being complete obliteration of the ovary and utero-ovarian ligament, the corresponding Fallopian tube being normal in location, size and conformation.

It is recognized that literally utilization of the designation "primary" ovarian gestation should be restricted to those examples in which fertilization of the ovum occurs before its liberation from the Graafian follicle, yet for reasons hitherto suggested demonstration of this feature may be absolutely impossible by any known method of examination. Therefore, certain modifications in the criteria of Spiegelberg seem essential, and since investigation heretofore prosecuted has suggested no reasonable and understandable explanation for the existence of so-called "blood-cyst" of the ovary (ovarian hematoma), pelvic hematocele (ovarian hematoma), apoplexy of the ovary (ovarian hematoma), rupture of the ovary (ovarian hematoma), etc., the following additional dicta appear pertinent:

(a) Provided the Fallopian tube be intact, i. e., unruptured, normal in location, size and conformation, if the ovary be implicated as suggested, even though "the gestation sac may not (invariably) occupy the position of the ovary" (Spiegelberg), ovarian gestation cannot be positively excluded:

(b) Provided the Fallopian tube be normal, if the ovary be markedly enlarged, even though histological investigation may not positively demonstrate "definite ovarian tissue in the sac wall" (Spiegelberg), ovarian gestation cannot be certainly excluded:

(c) Provided the Fallopian tube be normal, if the ovary be ruptured or incorporated in a cystic tumor, including the so-called pelvic hematocele, etc., more often than otherwise the origin is ovarian gestation:

(d) Provided the Fallopian tube be normal, if the ovary be entirely obliterated, as occurs in large tumors, lithopedion, etc., the ligamentum ovarii proprium may also be obliterated, hence the fact that the "gestation sac is not connected with the uterus" (Spiegelberg) is immaterial so far as the diagnosis is concerned.

Regardless of the diagnostic and anamnestic acumen of the observer, it is admitted without serious disputation that the ante-operative diagnosis of ovarian gestation is a physical impossibility, there being nothing pathognomonic in the clinical history nor the subjective and objective symptoms by which differentiation is practicable from other varieties of ectopic gestation, the conditions being the same

whether rupture has or has not supervened. Therefore, more often than otherwise the diagnosis is perfected anatomically only after either operation or necropsy. However, so far as treatment is concerned, the uncertainty in diagnosis is unessential, since prompt celiotomy with removal of the products of conception is imperative in every instance of extra-uterine gestation whether the variety be ovarian, tubal, or abdominal.

In discussing ovarian gestation, Gilford remarks that the first instance on record of impregnation of an ovum within a Graafian follicle is probably that which is mentioned by Bernutz and Goupil, that the second was recorded by Granville in 1820. Whether these observations are correct or otherwise is immaterial so far as this dissertation is concerned. The author mentioned (Gilford) in 1901 collected sixteen positive and twelve probable examples of ovarian gestation (total of twenty-eight), and suggests that many may have been recorded as blood cysts, rupture of the ovary and ovarian apoplexy. One explanation of how conception can occur within the Graafian follicle is that the sperm cell enters through the aperture produced by the bursting of a follicle and impregnates an ovum which has not yet escaped; the opening then closes and gestation proceeds in the sealed sac (Gilford). Another is that the spermatozoon penetrates the coat of the follicle at its most attenuated part (Schroeder).

Ovarian gestation is also discussed by Scott (1901) who suggests the possibility of ovarian hematomata being thus produced. An example is cited with details of macroscopic and microscopic investigation, his summary being as follows: "Ovarian hematomata are comparatively common, and no explanation has been offered for their occurrence. Continued development of the ovum in ovarian gestation induces such changes in the organs and tissues as to render the demonstration of its ovarian origin impossible. The most natural consequence of early death of the ovum in ovarian gestation is its gradual transformation into an ovarian cystic tumor, retrograde changes obscure its origin, and an hematoma is the final result."

Mayo-Robson cites an example in which the histological findings showed conclusively that fecundation of the ovum took place within the ovary, and agrees that it is not improbable some of the so-called ovarian blood-cysts, or hematomata, may be due to ovarian gestation. To settle the question he suggests the importance of careful microscopic examinations to gain evidence of impregnation, although in some instances owing to early death of the embryo subsequent changes may render identification difficult if not impossible.

Ectopic pregnancy has been observed with about equal frequency within child-bearing limits regardless of age, nationality or social condition, primiparæ and multiparæ being alike subject to the abnormal occurrence, and the ovarian variety is no exception to the rule. Therefore, in presenting excerpts of recorded examples all details concerning age, previous family, personal and parturient history are unimportant and may well be omitted from consideration. It seems superfluous to mention that with the advent of impregnation, whether it be intra- or extra-uterine, there is usually cessation of menstruation for a longer or shorter period, and other symptoms or signs of pregnancy are commonly promptly manifested. However, this is a rule to which there are many curious exceptions, e. g., pregnancy, normal or otherwise, may exist without observable objective or subjective evidence thereof for weeks or months; on the other hand, typical signs of pregnancy may be present in females who have never submitted to the process by which conception may be engendered.

As fairly representing the average record of ovarian gestation, a rather extensive excerpt of the clinical history and histological findings in the case reported by Freund and Thome, of Strasburg, is interpolated. The data given have been copied almost verbatim from an abstract of the original report prepared by Fehring from Virchow's *Archives*, Bd. 183, Heft i, and published in *Surgery, Gynecology and Obstetrics*, May, 1906, pp. 598-9. While this and the more brief additional subjoined excerpts embrace only a few of the recorded examples of ovarian gestation, it is believed sufficient evidence is thereby afforded to reasonably refute the statements of those who claim "ovarian gestation has no existence," or "is so exceptional that it is hardly worthy of consideration."

FREUND AND THOME: Patient aged twenty years, menstrual habits irregular, but after a period of amenorrhea lasting three months considered herself pregnant. In the third month she began to have slight hemorrhages, sacral and abdominal pains. External genitals under-developed, uterus slightly enlarged, firm, and freely movable; at the right of the uterus was a first-sized ovoid tumor, and ectopic pregnancy was diagnosed.

On opening the abdomen, the pelvis was found to contain 60 to 80 c.c. of sero-sanguineous fluid; left ovary normal, but occupied an abnormally high position; tubes shorter than normal, and showed suggestions of infantile folding. The right tube with its fimbriæ was entirely free and "in no way made up" a part of the tumor. The tumor resembled the gestation sac of ectopic pregnancy, and consisted of the enlarged right ovary, whose blood infiltrated surface showed multiple follicle-like projections. No point of rupture could be detected on the tumor wall.

The authors further describe the tumor as follows: "The mass is distinctly separated from the tube and its fimbriæ is irregularly spherical, and measures 6.5 x 5.5 cm. The gestation sac is a spherical cavity 32 mm. in diameter, which is completely lined by the membranes; the latter can be easily stripped from the wall. The thickness of the wall varies from 1.2 to 1.5 cm., except at the placental site, where it is over 2 cm. thick. The cavity contains an embryo 23.5 mm. long, which is connected to the wall by a slightly twisted cord 11 mm. in length."

Microscopically, the wall of the sac showed three layers; the innermost being amnion and chorion; external to this was a layer consisting mainly of erythrocytes, fibrin, and masses of detritus; the outermost layer, not definitely marked off from the latter, was ovarian tissue. The whole periphery of the vesicle showed villi, not numerous, but evenly distributed, and branching into the layer of blood and fibrin. The connective tissue of the villi was well developed. The epithelium of the amnion was in general cubical with ovoid nuclei. The variation in staining of the cell protoplasm in different cells in the same section, and the occurrence of vacuoles, were probably to be regarded as different functional condition of the cells. The syncytium was seen in some places as a simple layer, in others as bud-like masses of densely staining multiform nuclei, or as protoplasmic threads without nuclei. The outer layer of the sac consisted of ovarian tissue—chiefly fibrillar connective tissue. There was no small-celled infiltration, and elastic fibres were completely wanting. This tissue was quite vascular. The blood vessels must be regarded as dilated capillaries. Ova in various stages of development could be found in the outer layer of the sac wall.

From the clinical report and the findings the authors draw the following conclusions:

(1) This was undoubtedly a case of true ovarian pregnancy, for, in the first place, the ovum is completely surrounded by ovarian tissue containing larger and smaller follicles. There is no evidence that the ovum was first imbedded elsewhere and later found its way into ovarian tissue. The tube is separated from the ovary throughout its length, and no part of the fimbriated end is in any way connected with the gestation sac.

(2) Death of the embryo occurred some time before the operation, as evidenced by its small size, compared to the period of gestation. According to the former, it should be three months old, but its size would show it to be not more than five or six weeks. Moreover, there are no vessels in the villi or membranes, and no red blood corpuscles. The latter should be abundant, had the death of the embryo been quite recent. It is, however, possible that the embryo may present some developmental anomaly, as there is some want of differentiation of the face and extremities, but this might be due to post-mortem change. These questions, it is admitted, might be settled by a microscopical study of the embryo.

(3) The amnion (and to a less extent the chorion) continued to grow after the death of the

embryo, and were still alive at the time of the operation, as is shown by the appearance of the cell protoplasm and the nuclei. The small number and the wide separation of the villi may be accounted for by the fact that no new ones were formed, and the existing villi were separated by the growth of the chorion. Degenerated villi are found only in that portion of the chorion which would later have become the chorion laeve. The growing ovum met greater resistance from the dense ovarian stroma than it would in the uterine or the tubal mucosa, which is shown by the compressed connective tissue adjacent to the blood layer. There is nothing in the chorion to suggest malignancy.

(4) Decidual cells, "as might be expected," could not be found; and if present, it is probable that they would have been found in some of the hundreds of sections studied. The decidual cells may have degenerated, but it is more probable that none were formed. This view is supported by the fact that a number of other observers reporting ovarian pregnancies found no decidual cells. We (Freund and Thome) have previously shown (and this is supported by the researches of Wallingren) that decidual cells are by no means constantly found in tubal pregnancy. If decidual cells are not always present in tubal mucosa (which closely resembles that of the uterus) when it is the site of an ectopic pregnancy, it is not remarkable if they are absent in ovarian pregnancy. The authors claim to have found decidual-like cells in a hemorrhagic multilocular cyst removed from a patient in whom pregnancy could not be excluded. The presence of glycogen and the absence of fat are not proof of the decidual character of the cells.

(5) This pregnancy probably originated in a follicle. Most likely at the time of rupture the ovum did not escape into the abdominal cavity, but remained in the follicle, where it was fertilized. The follicle may have ruptured "into a recently ruptured follicle," which would favor its retention. The follicle may have ruptured into a cystic rest of the Wolffian tract. The ovum may not have been liberated from the *discus proligerus*, and as it may be fertilized in the tube while still surrounded by the *corona radiata*, we (F. and T.) may assume that the discus cells would not prevent fertilization. Finally, the ovum may have been fertilized in the abdominal cavity and become imbedded in a niche on the surface of the ovary. An inflammatory process or a cystic degeneration can be excluded. The abnormal development of the sexual organs must be considered.

GOTTSCHALK: Chief complaint severe pain in right side, diagnosis probable extra-uterine pregnancy. Celiotomy: Specimen showed right tube normal, site of ovary occupied by soft tumor size of orange, uterus normal. The ovarian tumor contained yellowish fluid, in which was the embryo laying in free yolk sac, the amnion being intact. In wall of gestation sac was a Graaffian follicle.

JAGGARD: Seven years previously, passed fleshy mass, pronounced by attendant "false conception." Since then every two years prolonged periods of uterine hemorrhage. A year ago missed two men-

strual periods, then copious hemorrhage, confined to bed three weeks, profuse irregular menstruation thereafter. Diagnosis, "granular endometritis, lacerated cervix, small fibroid posterior uterine wall, enlarged ovaries!" Curettment, trachelorrhaphy, improvement. Hemorrhage later recurred, again curetted without benefit. Celiotomy, gestation sac intact developed between layers broad ligament, fetus macerated, tube entirely separate.

EBERHART: Last menstruation June 6th, symptoms pregnancy few days thereafter. July 30th, uterine hemorrhage, "labor-like pains, fever." (This was probably when ovum began to suppurate.) Month later, uterus enlarged, soft, anteflexed, displaced to right; movable, elastic tumor size hen's egg left side. Diagnosis, ectopic gestation. Celiotomy September 8th: Tumor recognized as ovary with left tube passing over it. Interior of ovary rough, granular, contained several follicles, slimy pus mixed with thicker particles (suppuration). Tube impervious both extremities, filled with brittle epithelial masses. Sections of ovary showed distinct villi with tortuous fine vessels; decidua cells not demonstrated. Villi followed by layer containing numerous cells which gradually passed into ovarian stroma. The author remarks: "As the tube was found occluded at both ends, the case is of further interest because extra-uterine transmigration of the spermatozooids must have taken place."

HERZFELD: After normal delivery March 12th, patient noticed "another fetus seemed to be moving about in her abdomen." Abdominal enlargement increased, tumor extended above umbilicus, uterus distinct therefrom. Celiotomy March 24th: Large fetal sac right ovary, fetus nineteen inches long, placenta well-formed, tube normal. No demonstrable ovarian tissue remained in sac. This was true, also, in an example recorded by Sanger.

LANPHEAR: Last menstruation in May, symptoms of pregnancy. August 2nd, uterine hemorrhage, severe left-sided pain. Bleeding ceased, pain continued, great abdominal distension. August 15th, pelvis filled with boggy mass, tumor size of orange left ovarian region. Celiotomy, one and half gallons fluid and clotted blood; left ovary site of gestation, tube practically normal, placental attachment to ovary plainly visible, dead fetus. Microscopic examination, true ovarian gestation.

VAN TUSSENBROEK: Last period six weeks previously, clinical diagnosis, extra-uterine gestation. Celiotomy (Kouwer, 1897), great quantity free blood peritoneal cavity, clots adherent to right ovary. From fourth to seventh day after operation, fragments decidua membrane escaped from uterus. Ovary separate from tube, ovisac contained macerated fetus, and was within a corpus luteum, ovum surrounded by *theca interna*.

WITHROW: Menstruation latter part August, sharp attack left-sided pain October 1st; uterus enlarged, tender orange-sized tumor behind left broad ligament. Diagnosis, ectopic pregnancy. Before celiotomy decidua membrane removed from uterus by curettment. Tube intact, fimbriated extremity free, ovary continuous with gestation sac deep be-

hind left broad ligament, attached to anterior rectal wall by sac and old blood clots. "All indications ovarian gestation present."

ANNING AND LITTLEWOOD: Celiotomy for ruptured ectopic pregnancy, two pints blood clots. Small ovum found which fitted into firm envelope of laminated clots. Rent in right ovary leading to cavity containing blood into which ovum and sac exactly fitted, clearly indicating primary ovarian origin of the gestation.

BANDEL: Patient died of angina Ludovici. Necropsy, uterus enlarged, uterine decidua present. Both tubes inflamed, occluded, right-sided oöphoritis. At site left ovary tense, brownish-red egg-shaped tumor, left tube not attached to mass. Tumor contained chocolate brown blood, showed positive indications of pregnancy. Primordial follicles and other evidences of ovarian tissue in sac wall, corpus luteum present. "Salpingitis must have closed outer end of tube after passage of the spermatozoon."

FRANZ: Five weeks after menstruation severe pelvic pain, headache, confined patient to bed one week; there was no hemorrhage. Two weeks later pain recurred accompanied by hemorrhage, which persisted until date of operation. Celiotomy, tube normal, site of ovary occupied by hemorrhagic tumor which had ruptured at two points. Gestation four or five weeks development; immediately around ovum few small groups decidual cells.

THOMPSON: For last seven years more or less pelvic pain. Celiotomy, dark red tumor size horse chestnut sprang from left ovary, rupture had not occurred, proved to be ovarian gestation sac, tube normal. Fetus thirty days growth, no trace of amnion, follicle pregnancy.

DE LEON AND HOLLEMAN: Amenorrhea six weeks, four months later pelvic pain and hemorrhage. Celiotomy, tumor formed entirely of ovary, tube normal, no corpus luteum, probably follicle gestation. No fetus found, but many villi present. In wall of fetal sac, cells belonging to *theca interna*.

FUTH: Author described what he then considered the twenty-first example of proven ovarian gestation. The ovary participated in formation of the fruit-sac, which was connected with the uterus by the utero-ovarian ligament. There was complete freedom of the corresponding tube, including the *plica infundibulo-ovaralis*. A lithopedion was found on the opposite side of the abdomen.

MICHOLOTSCH: Right salpingo-oöphorectomy per vaginam, ovarian tumor size of apple. On section hematoma size of hazelnut found in smooth lined cavity. Capsule of hematoma showed ovarian tissue and chorionic villi.

IBID: Missed one menstrual period, four weeks later irregular hemorrhage. Left salpingo-oöphorectomy per vaginam, tumor partially torn loose from attachments during operation, but had been attached to utero-ovarian ligament. Definite ovarian tissue and chorionic villi in gestation sac; fetus not found.

BOESBUCH: Irregular menstruation, probable ectopic gestation, no decidua passed. Celiotomy, parovarian cyst, corresponding ovary twice normal



size and ruptured. Villi found at point of rupture, syncytial cells discovered in various portions of ovisac wall.

FREUND AND THOME: (See detail report): Amenorrhea three months, then uterine hemorrhage, sacral and pelvic pain; uterus enlarged, freely movable; to right ovoid tumor size of orange. Celiotomy, pelvis contained considerable quantity sero-sanguineous fluid. Tumor, enlarged right ovary, on blood infiltrated surface multiple follicle-like projections; tube entirely free. Small dead fetus; outer layer gestation sac ovarian tissue.

HEWETSON AND LLOYD: Six weeks after last menstruation severe pelvic pain and collapse, following day blood and shreds *per vaginam*. Celiotomy, large amount dark colored fluid in peritoneal cavity; uterus enlarged. Pregnant ovary was represented as a rounded plum-colored mass; small amniotic cavity. (This patient was sent to hospital with diagnosis of subacute appendicitis.)

KELLY AND McILROY: Had not menstruated six weeks, severe pain both iliac regions, hemorrhage following day. Two weeks later, diagnosis extra-uterine gestation. Celiotomy, unruptured hemorrhagic cyst size large plum sprang from left ovary, tube normal. Left ovary twice normal size; gestation sac extremely thin, no fetus found; well developed corpus luteum. Entire gestation sac, ovarian tissue.

JACOBSON: Missed one menstrual period, four days thereafter uterine hemorrhage and pain, passed fragment whitish in color, size of walnut. Diagnosis ectopic gestation. Celiotomy, oöphorectomy and partial salpingectomy, ovary represented by rounded mass, near center small cavity containing embryo.

SCHICKELE: Amenorrhea two months, then irregular hemorrhage lasting three days, no pain nor collapse. Celiotomy, tube normal, gestation sac ruptured, large "pelvic hematocele" in which were found chorionic villi and amniotic remains.

WEBSTER: Missed one menstrual period, severe abdominal pain, following day blood and shreds *per vaginam*. Celiotomy, half ounce dark fluid in utero-vesical pouch. Small ovarian tumor irregularly rounded, slightly adherent to adjacent structures, amniotic cavity in center of mass; tube normal.

IBID: One menstrual period missed, irregular bleeding became profuse, patient confined to bed; uterus normal in size. Celiotomy, right ovary converted into rounded dark-colored tumor adherent in Douglas cul-de-sac, surface lobulated. In center of ovarian tumor small ovoid cavity lined with amnion and containing fluid; tube normal. Fetus attached to wall of cavity.

KERR: Last menstruation November, missed December; in January two attacks pain. Diagnosis ectopic gestation. Celiotomy, January 13th, uterus enlarged, two pints dark blood in peritoneal cavity; right tube and ovary excised. Tube slightly enlarged, hemorrhagic, rupture had occurred; large corpus luteum present. The ovum was found, amniotic cavity small; follicle pregnancy. Two hundred and seventy-six days after last menstruation, viz., August 19th, the patient gave birth to

healthy full term child. The author believes the intra- and extra-uterine pregnancies began at the same time.

NORRIS AND MITCHELL: One menstrual period missed, week later irregular hemorrhage, abdominal pain, characteristic of ectopic gestation. Celiotomy, considerable free blood in peritoneal cavity, ovary enlarged; tube normal. Springing from interior surface of ovary gestation sac, outer covering continuous with *tunica albuginea*. In center of ovisac was amniotic cavity. Ovary unusually vascular, center occupied by large *corpora albicantia*. Between ovisac and ovary large corpus luteum; no fetus found.

NORRIS: Last menstruation March, each month thereafter until August "slight show." In August profuse hemorrhage three days, menses irregular until October, then ceased. No pronounced pain any time. Uterus enlarged, deviated to right, left central portion abdomen occupied by irregular mass reaching nearly to umbilicus separated from uterus by distinct groove. Celiotomy following February, left ovary gestation sac size of orange, ruptured, fetus macerated, five months' development. Tube normal; sac contained placenta and membranes.

KIRCHNER: Tumor noted right ovarian region, which as pregnancy advanced, was pushed toward left. Fetal movements fifth month. Celiotomy, tumor resembled ovarian cyst, contained full term healthy fetus which was easily resuscitated. Left tube free, right incorporated with outer surface of gestation sac; ovarian ligament connected with gestation sac which contained placenta and fetal membranes.

MACDONALD: Missed one period. Four hours after development of symptoms indicating rupture of ectopic gestation, celiotomy revealed pelvis filled with blood clots, no active hemorrhage. Right ovary soft, collapsible, three times normal size, "hollowed out from above" so that only thin layer ovarian tissue remained to form sac wall. Cavity within ovary contained small clot, after removal of which slight oozing noted.

BALLERAY: Two weeks after regular menstruation, irregular discharge of blood. Interval of month with no hemorrhage then recurrence with intense pelvic pain, distension and vomiting. Celiotomy, four months' fetus; exterior of sac ovarian tissue.

RUBIN: Sharp radiating pain right side; chilly sensations, fever, weakness, leucorrhea, abdomen tympanitic; tenderness left side. Uterus enlarged, on left small tender mass. Diagnosis, probable ectopic gestation. Celiotomy, uterus non-pregnant size, left tube bent upon itself, attached to ovarian mass, adherent to broad ligament near uterus. Left ovary edematous, chocolate-brown irregular (protruding) surface, considered degenerated *corpus luteum verum*. Small plum-colored mass (hazelnut size) free in pelvis. Site of gestation left ovary which was attached to uterus by proper ligament.

PRINCE: Last menstruation June, nausea, fainting spells. In August slight return of menses, pelvic pain. In November violent fetal movements, uterine hemorrhage. Following February move-

ments more pronounced, hemorrhage, clots and "pieces of flesh" being passed. Irregular nodular tumor occupied entire pelvis. Diagnosis, dermoid cyst right ovary. Celiotomy, intestines, uterus, right tube and ovary densely adherent. Tumor composed of enormously enlarged right ovary which contained fully developed dead child weighing  $7\frac{1}{2}$  pounds.

**YOUNG AND RHEA:** Embryo found in blood clots contained in tissue corresponding to left ovary. The ovary surrounded by blood clot and connected to no other structure except in normal manner. Ostium of corresponding tube closed; opposite tube showed no disturbance except such as might result from pelvic peritonitis. Blood clot entirely about left ovary, not reaching right tube, and right ovary showed no *corpus hemorrhagicus*.

## ADDENDUM.

**MALL AND CULLEN:** Since completion of the foregoing paper a typical example of "ovarian pregnancy located in the Graafian follicle," has been recorded by Mall and Cullen. Patient, aged twenty-four, unmarried, entered the hospital with history of abdominal pain, symptoms indefinite; provisional diagnosis, appendicitis. Celiotomy (Dr. Finney) revealed abdominal cavity filled with blood; both ducti Fallopii intact; extensive hemorrhage had occurred from rupture of enlarged right ovary which contained impregnated ovum. The authors present complete reports covering details of laboratory examinations with excellent photographs of the gross specimen, both before and after section, showing gestation sac (cavity, containing blood clot and villi, lined with layer of lutein cells) and situation of ovarian rupture; also several microphotographs illustrating the more intricate laboratory findings, all tending to conclusively prove the presence of primary ovarian gestation; the spermatozoon evidently entered the Graafian follicle immediately after rupture and fertilized the ovum before its extrusion therefrom.

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## VARIATIONS OF APPENDICITIS

It is interesting to note the great degree of certainty with which one can predict the anatomical position of the appendix in several positions. Lumbar pain with a history of repeated fleeting abdominal pains since childhood is quite certain to mean a congenital lesion. In these cases there is a short mesoappendix, or the appendix is largely or sometimes entirely behind the peritoneum, extending far up behind the cecum and ascending colon, thus bearing a close proximity to the lumbar muscles. These cases resemble ureteral calculi and sacroiliac disease. Then, again, when the appendix is close to the bladder or attached to it, bladder symptoms are prominent.—GEORGE W. CRILE in the *Pennsylvania Medical Journal*.

## TWO CASES OF UNUSUAL COMPLICATIONS FOLLOWING CRIMINAL ABORTION.\*

RUFUS B. HALL, M.D.,

CINCINNATI, OHIO.

Complications following criminal abortion are of frequent occurrence; and they are so far-reaching in their varied pathology that they are much dreaded by every physician called upon to treat them.

It is not my purpose to offer anything new, nor to call attention to the many dangers and the varied complications following in the wake of these operations, for they are all too familiar. I desire, rather, to place upon record two cases of unusual complications, each of which required the most serious operation to save the patient's life; also, to make some suggestions looking to early surgical intervention, such as vaginal section and drainage in those cases of infection in which the uterus has been perforated, and the early drainage of pus accumulation, with the hope of avoiding more serious complications later.

I am convinced from my experience in the management of a large number of these cases, that early vaginal section and free drainage will not only save many lives and shorten the period of convalescence, but will also prevent more serious complications, which will certainly follow if pus accumulation is left to be taken care of by Nature's process.

CASE 1. Mrs. O. L., age 32, mother of one child, was seen June 9, 1906, in consultation with Dr. C. E. Van Meter, who had been called to take charge of the case the preceding day. Inquiry elicited the following history: Menstruation was established when the child was five months of age. The second period came six weeks later; the next in five weeks after that date. When the menses did not again recur at the expected time, the patient, fearing that she was pregnant, used domestic remedies for several days to bring it on, without success. The patient was a frail, poorly nourished, small woman, the wife of a laboring man, and did not want another child. She went to a doctor whom her neighbors told her performed abortions. The patient said that he used an instrument inside of the uterus and her description of it was that of a uterine probe. She made four or five visits to his office at intervals of four or five days. At each visit the doctor used the same instrument, but the patient said he did not cause much pain, until the last visit, on March 5th, when he told her that he was going to use more energetic treatment, and it would surely bring on her period. This treatment caused great pain and she had great difficulty in reaching her home, which was a mile or more from the doctor's

office by street car. Arrived home, another physician was called and found her in collapse. But he was kept in ignorance of the fact that she had consulted or been treated by the abortionist. The patient developed a general peritonitis of a severe type and for many days her life was despaired of. Two or three days after the peritonitis commenced, she informed her physician of having consulted the abortionist, and asked him why she had not aborted. Nor at any time during the subsequent illness did the patient abort. The subsequent history of the case proved that she was not pregnant at the time she visited the abortionist, and that he perforated the uterus and infected her in his manipulations. These people were like many in the city, and when they found that the patient did not recover quickly, they discharged their doctor after three or four weeks and sent for another one. This second physician treated the patient for a few weeks and he was likewise discharged. Several physicians had been in attendance and several consultations had been held over the patient. The last was a few days before the case was seen by me. At that time the specialist, who is one of the leading men in our city, is reported to have stated that the patient had a large ovarian tumor, and that she also had sepsis, but her condition was so desperate that an operation was not to be thought of at that time.

After this report the husband discharged both physicians and called Dr. Van Meter. The patient's condition at that time was desperate, for she had been confined to her bed with sepsis for fourteen weeks. She was greatly emaciated, having a chill every day or two, followed by profuse sweats, her pulse was feeble and rapid, often reaching 160 and 170 after her chill, with a temperature from 101° or 102° to 104° or higher. The abdomen was as large as that of a woman at full term, and appeared much larger in her emaciated condition. By every physical sign, one would be justified in saying the enlargement was due to an ovarian tumor. Resonance could be elicited in two small areas only; one over the hypogastric region, 1½ inches by 3 inches, the other in the left lumbar region, 1½ inches by 2 inches. We doubted the presence of a cyst. The contour of the abdomen with the patient on the back was more flattened out than is usual in ovarian cyst. The history was that of infection and it was more probable that the fluid was in the abdomen than in a cyst. We advised operation, as that promised the only hope.

The operation was performed at the Bethesda Hospital, June 11, 1906. An abdominal section was made and 2½ gallons of thin, yellow pus were evacuated. After the abdominal cavity had been cleansed, a most interesting condition was observed; all of the intestinal coils were adherent together and to the posterior wall, and not a single inch of the intestinal tract could be recognized as such. The uterus had been lacerated at the fundus from one horn to the other, and in this rent there was lodged the great omentum, which was now greatly thickened. The omentum was not adherent to any of the viscera or to the abdominal wall. The only operative procedure inside of the abdomen was the

\*Read by title at the meeting of the Southern Surgical and Gynecological Association, Atlanta, 1913.

ligation of the proximal side of the omentum and dividing it close to the fundus of the uterus. After lifting the omentum up, with the greatly relaxed abdominal wall, we could better inspect the cavity, and then could be observed slight elevations representing the intestinal coils. There was no pelvic cavity, but the fundus of the uterus was projected into the abdomen  $\frac{1}{2}$  or  $\frac{3}{4}$  of an inch above the surrounding tissues. The whole abdominal cavity was thus a huge pus sac, which was flushed with very warm normal saline solution and closed with drainage.

It was remarkable how the operation benefited the patient. The chills did not recur, the pulse improved, the temperature did not run so high, and when it did rise it remained up for but a short time. The patient improved as well as one could ask from the hour of the operation. She took liquid nourishment only but freely and with a relish. On the second day she passed flatus freely and had a good bowel movement on the third day, and one on the fourth day following the operation. She felt fine on the fifth day, also on the sixth day, June 17th, until the evening of that day. In the night she complained of pain in the abdomen and was unable to pass any flatus at all. The patient had complete obstruction of the bowels from that date until 9 P.M. June 23rd, a period of six days. She had regurgitant and fecal vomiting on June 18th. From our knowledge of the condition of the intestinal tract, I felt certain that the treatment could not be surgical. I could not conceive how one could hope to successfully deal with the obstruction if the abdomen was reopened. For that reason conservative treatment was adopted. We resorted to frequent lavage of the stomach, withholding all nourishment from the mouth, with rectal feeding and hypodermic medication as indicated. The evening of the sixth day of obstruction, the abdomen was greatly distended, yet the patient appeared to be holding her own for the past three days. The pulse and temperature both were much more satisfactory than before the operation. The family and friends were clamoring for some kind of an operation to relieve her, because the previous operation did so much. We urged no operative interference, believing that by an operation we would certainly take away any chance she might have. Besides, nature might be able to right the difficulty. In the evening of that day she was able to pass flatus, and within a few hours the abdominal enlargement was greatly reduced and the patient was taking albumen water freely and retaining it. From that date she convalesced slowly but steadily, and was able to leave the hospital on July 9th, twenty-eight days after the operation. She gradually regained her health, and at the end of seven months she had resumed her usual weight and strength. It is now seven years since the operation. The uterus and ovaries are fixed in the pelvis and she remains sterile.

The case is interesting and unique in my experience in that class of cases in which the uterus has been perforated in attempts at abortion, in that the patient could survive from infection with pus in

the pelvis for so many months, which gradually increased in quantity until the abdomen became so large that it simulated a large ovarian tumor; and in that she should have complete obstruction for six days and yet nature should again assert its powers in her behalf,—a treatment, however, that I would hesitate to recommend for obstruction ordinarily following operation. It is the only case to recover so treated that I have any knowledge of. This recovery can be accounted for by the intestinal tract being so fixed by the inflammatory process as to prevent sharp angulation of the canal when it became distended by gas.

CASE 2. Referred by Dr. Chas. Belt, Batavia, Ohio, February 3, 1913, after an illness of more than two years. The following is a condensed history of the case, giving only the more important points up to the time of that visit. Mrs. T., age 38, one child, aged 12 years. In January, 1911, the patient had an abortion followed by severe infection and peritonitis. She was very sick for many weeks, with high temperature, great abdominal distension, and irregular chills, followed by profuse perspiration. About ten weeks after the infection, there was a free discharge of pus (estimated to be a pint or more) from the patient's bladder. From this time her condition slowly improved. The urine contained a large amount of pus, varying from three to eight ounces in twenty-four hours. The bladder soon became very irritable and caused great suffering from the constant tenesmus. About eight weeks after the first discharge of pus and about eighteen weeks after the infection, the patient's condition was much improved. The abdominal distension was greatly reduced, and the pain in the pelvis and the abdomen had about disappeared. The chills did not recur so often; the discharge of pus was less and the sweats were not so profuse. The patient was able to be propped up in bed and was comparatively comfortable, excepting the constant bladder tenesmus. After a few days of this apparent convalescence, the pus almost entirely disappeared from the urine. Within two or three days the pain in the pelvis and abdomen returned. The temperature and pulse rose and the sweats again became very profuse, with complete loss of appetite. The patient was again very ill. All of the severe symptoms continued for eight or ten days, when the abscess again discharged a pint or more through the bladder. This was followed almost immediately by relief. The patient improved rapidly and within a week or so was again able to sit up. The convalescence appeared to be satisfactory, excepting that there was a great quantity of pus in the urine and the bladder tenesmus was very distressing, preventing the patient from securing much sleep. She was now able to be up a part of each day. This improvement continued for a period of about seven or eight weeks, when the pus again almost entirely disappeared from the urine. Within a day or two all of the old symptoms returned, showing the effect of pent-up pus. She was again very ill for a period of eight or ten days, when the abscess again emptied itself into the bladder. This was followed by prompt relief of all

of the severe symptoms and general improvement. In about five or six weeks, menstruation was established for the first time since the illness commenced, more than eight months before. The flow continued five days. She menstruated irregularly afterwards, about every three to eight weeks. The duration of the periods varied from five to seven days, the normal period being three to four days. The patient was able to be up most of the day and direct her household duties. Up to the time of the last relapse, which occurred about January 20, 1913, the history of the case was a repetition of that given above. While the abscess was discharging freely, the patient's condition was bearable, yet she was septic at all times. Once every six, seven or eight weeks, the opening would close, to be followed by a week or more of fever, pain and severe illness, until it again discharged its contents into the bladder. The last attack did not differ from the many which had preceded it, except that the pus contained some fecal matter. The patient recovered from this attack as rapidly as any which had preceded it, except that the bladder tenesmus was greatly aggravated. The feces discharged through the bladder rapidly increased in amount. Her suffering from the bladder tenesmus was so great that she for the first time would consider the repeated urgent advice of her physician to submit to an operation.

At the time of her visit to me, she weighed about ninety pounds, her normal weight being 120. She was very feeble and was just up a few days from her recent relapse. At the time of the examination, the patient said that since her first illness she always had pain in the right side of the pelvis and abdomen, and the urine contained a large amount of pus, excepting during her acute attacks, at which time it was greatly reduced. The urine now contained a large amount of pus and bowel contents. Examination revealed the uterus slightly enlarged, pushed to the left side of the pelvis, and fixed, with a large mass at the right, which, with the uterus, filled the pelvis full, and extended some three inches above the pubic arch. The right kidney was below the border of the ribs and was more than twice the normal size. The left kidney could not be palpated. A cystoscopic examination revealed the bladder contracted and very much inflamed. The left ureteral opening could be easily located, discharging normal urine into the bladder. Near to and in front of the right ureteral opening was a tumor mass as large as the end of the index finger, which proved to be the opening into the bowel and abscess cavity. The right ureteral opening could not be located, which was much regretted, on account of the enlarged kidney on that side. But inasmuch as the kidneys were secreting almost or quite the normal amount of urine, an operation was advised and made the following day.

Upon opening the abdomen, there were no adhesions to the abdominal wall. The pelvic cavity and the lower right side of the abdomen were filled with a mass that included the bladder, uterus, and several coils of small intestines. The fingers could be passed to the left of the uterus, down to the pelvic

floor, there being no adhesions on that side. No ovary could be detected. The uterus and the tumor in the right side filled the pelvic cavity. On the top of these were the great mass of adherent coils of intestines. These were separated from the uterus and bladder, inspected, wrapped in gauze and laid aside. The tumor, which proved to be a pus tube and suppurating ovary, with a perforated appendix, was removed. The bladder was liberated from its adhesion to the anterior wall of the uterus, and found to be greatly thickened, with a hole in it through which the thumb could be easily passed. The opening in the bladder, owing to the greatly thickened condition of the bladder wall, was closed very imperfectly with catgut. Turning to the repair of the intestine, there was a large opening into the mass of adherent bowel, through which the finger could be passed. In separating the different coils, four in number, each was found to have an opening at the point of attachment to the bladder. These openings were separated from each other distances of about twelve to eighteen inches. There was also a large ragged hole in the head of the colon. These were repaired by suture of Pagenstecher's linen. The right kidney was examined and nothing abnormal could be detected, excepting its greatly increased size. The left kidney was normal in size. As mentioned before, there were no adhesions on the left side. There was also a complete congenital absence of the left ovary and tube. It is unusual to have a pelvic abscess open into the bladder. This is the first case that I have observed. The patient had a slow but satisfactory convalescence. She has regained her former weight and strength, and excepting the usual reflexes of the menopause, is enjoying excellent health.

These cases are interesting as illustrating in a marked degree the tenacity to life in some cases of infection. They also emphasize the serious and dangerous complications arising in these infectious cases, where accumulations of pus are left to nature in place of being treated by modern surgical methods.

There is no question but that it requires good surgical judgment in the management of infection following abortion, to decide which one should be drained and which one should not be, especially these cases of criminal abortion. In many cases, the patient uses various instruments upon her own person, and not infrequently perforates the uterus in her attempts at abortion, and the danger of infection is very great. Also, I am convinced that not infrequently do professional abortionists perforate the uterus in their attempts at abortion.

In the treatment of this class of cases in my public hospital work, as well as cases seen in private practice, for years I have frequently made vaginal section and drainage. In those cases of infection in which we suspect that the uterus has

been perforated, and especially if there is an accumulation of peritoneal fluid in the pelvis, the drainage should be established early, not waiting for the formation of pus. In all cases that do not progress satisfactorily after a period of six or eight days from the commencement of the infection, drainage should be considered and the case watched carefully for a pelvic accumulation, and if that occurs, drainage should be established at once. In not a few cases three or four weeks may elapse from the time of the infection before the accumulation of fluid or pus formation can be made out, but as soon as it can be done drainage should be established. If case No. 1 in the report had been subjected to a vaginal drain within a week or so after her last visit to the abortionist, she would probably have made a prompt recovery after a short convalescence. If case No. 2 had had a vaginal section made three or four weeks after her first infection, she would likewise have recovered with a comparatively short convalescence.

#### RECTO-SIGMOIDAL CANCER.

The radical cure of carcinomata of the rectum has a bad name in surgery, which is due more to inefficient methods of operation and purely sentimental attempts to conserve function than to the character and location of the disease. We are coming to the conclusion that a permanent colostomy in the middle of the left rectus muscle should be made as the primary operation in the majority of cases of carcinoma of the ampulla of the rectum, and at a second operation, after the lower segment has been properly cleansed, the entire rectum should be removed from behind. This method offers the patient moderate control, with the best chance of a permanent cure.

High rectal and rectosigmoid growths will often be best approached through the abdomen or by the combined method. The perineal operation should be reserved for growths in the anal region.

The frequency with which secondary carcinomata of the liver, peritoneum or inoperable glandular involvement occur, makes it imperative in all cases of carcinomata of the rectum and rectosigmoid to first open and thoroughly explore the abdomen to see whether the case is one which should be submitted to operation; and, if advisable, a permanent colostomy can be made at this time.—WM. J. MAYO, in *The Journal-Lancet*.

#### AN IMPROVED SURGICAL NEEDLE.

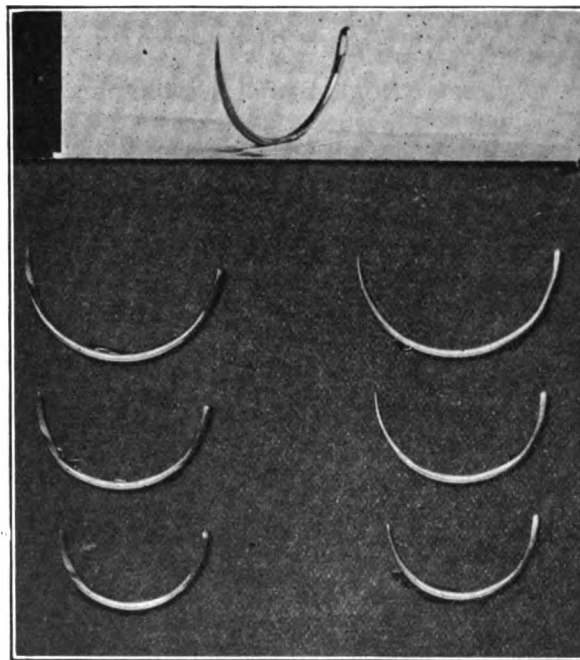
CHARLES ALFRED DUKES, M.D.,

Chief Surgeon, Gynecological Staff, The Samuel Merritt Hospital, March to September; Chief Surgeon, National Guard of California.

OAKLAND, CAL.

These needles have the following features:

The eye is large enough to be easily threaded with large suture material, is grooved to take care of the doubling of the material, and is not any larger than the shaft of the needle,—hence there is no tearing or cutting of tissue.



They are made of steel which bends but does not break, and is not plated.

They are made in round non-cutting edge, and with spear point.

They can be grasped close to the eye without danger of breaking, and they will not turn in a needle holder if firmly held at this point.

In injuries and infections of the thumb make especial effort to preserve as much of it as possible. Even a stump of thumb is valuable, and a thumbless hand is sadly crippled, indeed.

The x-ray shadow of a calcareous deposit seen in cases of subacromial (subdeltoid) bursitis is not in the bursa, as commonly supposed, but in or on the supraspinatus tendon, the lesion in which causes the bursitis.



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**WALTER M. BRICKNER, M.D., Editor**

NEW YORK, MAY, 1914.

## THE FATE OF THE SURGEON.

The medical sciences have become so amplified that no individual any longer attempts to master all of their branches. Medical practice has now become a matter of team-work. In the diagnosis and treatment of a surgical disease, the patient, who can afford it, has the advantage of several experts in several specialties. The family physician once represented all of the skill—both medical and surgical. Later the surgeon represented all of the surgical skill. Now the surgeon shares it with other specialists having to do with surgery.

The radiographist, the gastro-enterologist, the urologist, the bacteriologist, and all of the specialists at times perform services which the patient needs and which the surgeon cannot perform. Besides these there are the nurse, the historian, and the anesthetist—all important adjuncts. Moreover, while the dividing line between surgical and medical diseases is being more clearly defined, the dividing line between surgical and medical patients scarcely longer exists. As a nearer approach to perfection in the treatment of surgical diseases is attained, more and more attention is given to the whole patient, who is now regarded as a community of organs with various disorders and possibilities of disorder, all more or less intimately correlated to the surgical disease. The best results in surgical works are attained when these facts are reckoned with.

While this trend in the development of surgery is of importance from the scientific standpoint, it has also a significant relation to the economics of our art. It is developing at a time when there is a strong urge towards the larger social application of all useful knowledge and skill. So long as the various scientifically coordinated specialties remain economically separate business enterprises, defeat of their best possibilities is invited. Their highest sphere of usefulness can be attained only by their economic as well as scientific coordination.

This means that either the members of the medical profession must go into partnership with one another or that they must go into partnership with the public. Either economic competition must fall in line and give place to economic cooperation, just as we now have scientific cooperation; or the public must confiscate the medical profession as it is now proceeding to do in England. The surgeon must syndicalize himself or the public is going to socialize him. One or the other of these is inevitable. Either is to be preferred to the present competitive system in which both surgeon and patient are the victims of economic maladjustment.—J. P. W.

## THE REMOVAL OF THE APPENDIX IN APPENDICULAR ABSCESS.

We were much interested, and rather surprised, to learn from a recent article by Van Buren Knott (*Journal of the A. M. A.*, March 28th) that the practice is still very common among surgeons of merely draining appendicitis abscesses without removing the offending organ. We agree with Knott that this insufficient surgery is not good practice. It usually involves the necessity of a second operation, often preceded by debilitating sinus suppuration; and, rather than avoiding danger, it invites it. The policy of leaving the appendix is based, no doubt, on the fear that by separating "protecting" or "walling-off" adhesions in the effort to remove it, infection will be spread to the uninvolved peritoneum. This is an old fear inherited from the earlier methods of dealing with appendiceal suppuration, and quite abandoned, we thought, by experienced surgeons. Repeated observations quite justify the opposite stand, viz., that the most important step in the prevention or cure of suppurative peritonitis is the immediate removal of its possible focus. Moreover, as Knott points out, the exposure of the appendix also often reveals other pockets of pus that, unemptied, would have caused serious mischief. The search for and amputation of the appendix is, to be sure, often not a simple matter, but to the experienced surgeon (and no sur-

geon is worthy of the name who has not operated upon a great many such cases) it presents no technical difficulties or terrors.

To be sure, occasionally one encounters a case in which the local conditions and the patient's general condition suggest the wisdom of leaving a search for the organ for a subsequent procedure. These are the exceptions which even the most skilful operators will recognize and respect. The inexperienced operator, called upon in an emergency, for example, to relieve an appendicitis abscess, or encountering a condition beyond his technical ability, will, of course, by doing the greatest justice to his patient by contenting himself with thorough drainage.

As a surgical principle, for routine application, the important consideration in the operation for appendicular suppuration—localized or diffuse—is the removal of the gangrenous or perforated appendix after wiping or emptying away the pus.—W. M. B.

#### THE MEETINGS OF THE AMERICAN AND INTERNATIONAL SURGICAL ASSOCIATIONS.

A unique and interesting occasion was the annual meeting last month of the American Surgical Association and, immediately after it, the fourth triennial congress of the International Surgical Association (the first held outside of Belgium), both at the Hotel Astor, New York. Essentially this was a joint meeting, for many of the hundred or more eminent European surgeons attended or took part in the meeting of the American Surgical Association (April 9 to 11), and the latter organizations actively participated in, and was host of, the international congress (April 13 to 16). Numerous hospital clinics added much to the interest of the visitors.

The subjects discussed at the two meetings were not numerous, but, as might be expected, the papers read were of high order and were discussed actively. The contribution that made the most profound impression was Erich Lexer's studies and clinical experiences in transplantations.

We have thought these combined meetings of so much interest that we have prepared a brief report of them, which will be found in this issue, on page 206.—W. M. B.

#### JOSEPH D. BRYANT.

A solemn incident marked the first day's session of the American Surgical Association—its attendance, in a body, at the funeral of its late

member, Joseph D. Bryant, for many years professor of surgery at the Bellevue Medical School and Surgeon to Bellevue Hospital, New York.

Dr. Bryant was more than an eminent surgeon and an admired teacher. He was an organizer and a respected councillor in hospital, university, medical association, military and public health affairs, vigorous, upstanding and broad-spirited. A mere list of the offices he had held, in addition to his academic and clinical positions, will indicate the breadth of his interests and the respect he inspired in their pursuit: President of the N. Y. Academy of Medicine, of the N. Y. State Medical Association, of the Medical Society of the State of New York, of the American Medical Association; Health Commissioner of the City of New York, and of the State of New York; Surgeon-General (Brigadier-General) of the National Guard of the State of New York. Dr. Bryant was a national figure, as the close friends and medical adviser of President Cleveland and, on his own account, for the vigorous manner in which as State Health Commissioner in the early nineties, he stopped a threatened importation of cholera that had alarmed the whole country.

Two large works especially mark Dr. Bryant's contributions to American medical literature, his excellent two-volume treatise on Operative Surgery and the eight-volume System of Surgery which he edited with Prof. Albert Buck.—W. M. B.

### Surgical Suggestions

The risks of pylorotomy can be reduced by performing it in two stages—first the gastroenterostomy, later the resection.

In cellulitis of the fingers, avoid if possible, incisions over the tendons which, by exposing them, encourages their destruction.

When amputating an infected finger or toe it is very desirable to snugly ligate each tendon, sheath and contained tendon to prevent the entrance of infection into them.

Acute flexion is the best position in which to dress elbow fractures through the humerus. Care must be taken, of course, to avoid skin decubites and obliteration of the radial pulse. *Early* passive motion is highly important.

## Surgical Sociology

Ira S. Wile, M. D., Department Editor.

### THUMBS AND WORKMEN'S COMPENSATION ACTS.

Among the most characteristic features of the human being is the development of the hand. To be a handy man requires the possession of all the fingers and both thumbs. The industrial value of an individual is interfered with to a greater extent by the loss of a thumb than by the loss of an eye.

The relative values and importance of the fingers decrease in a direct ratio to their distance from the thumb. It is of interest, in view of the various workmen's compensation acts which have been enacted, to note what consideration has been given to injuries occurring to thumbs and fingers. In many of the laws no specific compensation is given for particular fingers of thumbs, but the compensation is given for total injury of the hand. There are various rules existing for compensations for the loss of a phalanx or even or two phalanges. The difference in values of the thumbs and various fingers is worth considerable study, not alone from the standpoint of conservative surgery, but also from the standpoint of medical jurisprudence and social legislation.

Without discussing the merits of the various laws that have been enacted, we append a résumé of the compensation for minor disabilities as found in the compensation acts of twelve states where the disabilities and compensations are specifically mentioned.

**Connecticut.**—For the loss of a thumb, thirty-eight weeks; for the loss of a first finger or a great toe or third finger, twenty-five weeks; a fourth finger, twenty weeks; for the loss of any toe except the great toe, thirteen weeks. The loss of one phalanx of a thumb or two phalanges of a finger shall be considered half the loss of a thumb or finger respectively, and shall be compensated accordingly.

**Illinois.**—For the loss of a thumb, or the permanent and complete loss of its use, fifty per centum of the average weekly wage during sixty weeks.

For the loss of a first finger, commonly called the index finger, or the permanent and complete loss of its use, fifty per centum of the average weekly wage during thirty-five weeks.

For the loss of a second finger or the permanent and complete loss of its use, fifty per centum of the average weekly wages during thirty weeks.

For the loss of a third finger, or the permanent and complete loss of its use, fifty per centum of the average weekly wage during twenty weeks.

The loss of a fourth finger, commonly called the little finger, shall be considered to be equal to the loss of one-half of such thumb, or finger, and compensation shall be one-half the amounts above specified.

The loss of one phalanx of the thumb, or of any finger, shall be considered to be equal to the loss

of one-half of such thumb, or finger, and compensation shall be one-half the amounts above specified.

The loss of more than one phalanx shall be considered as the loss of the entire finger or thumb; provided, however, that in no case shall the amount received for more than one finger exceed the amount provided in the schedule for the loss of a hand.

**Iowa.**—For all cases included in the following schedule compensation shall be paid as follows, to-wit:

(1) For the loss of a thumb, fifty per cent of daily wages during forty weeks.

(2) For the loss of a first finger, commonly called the index finger, fifty per cent of daily wages during thirty weeks.

(3) For the loss of a second finger, fifty per cent of daily wages during twenty-five weeks.

(4) For the loss of a third finger, fifty per cent of daily wages during twenty weeks.

(5) For the loss of a fourth finger, commonly called the little finger, fifty per cent of daily wages for fifteen weeks.

(6) For the loss of the first phalanx of the thumb or of any finger shall be considered to be equal to the loss of one-half of such thumb or finger, and compensation shall be one-half of the amounts above specified.

(7) The loss of more than one phalanx shall be considered as the loss of the entire finger or thumb; provided, however, that in no case shall the amount received for more than one finger exceed the amount provided in this schedule for the loss of a hand.

**Massachusetts.**—For the loss by severance at or above the second joint of two or more fingers, including thumbs, or toes, one-half the average weekly wages of the injured person, but not more than ten dollars nor less than four dollars a week, for a period of twenty-five weeks.

**Michigan.**—For the loss of a thumb, fifty per centum of the average weekly wages during sixty weeks.

For the loss of a first finger, commonly called index finger, fifty per centum of average weekly wages during thirty-five weeks.

For the loss of a second finger, fifty per centum of average weekly wages during thirty weeks.

For the loss of a third finger, fifty per centum of average weekly wages during twenty weeks.

For the loss of a fourth finger, commonly called little finger, fifty per centum of average weekly wages during fifteen weeks.

The loss of the first phalanx of the thumb, or of any finger, shall be considered to be equal to the loss of one-half of such thumb or finger, and compensation shall be one-half the amounts above specified.

The loss of more than one phalanx shall be considered as the loss of the entire finger or thumb; provided, however, that in no case shall the amount received for more than one finger exceed the amount provided in this schedule for the loss of a hand.

**Nevada.**—For the loss of a thumb, fifty per cent

of the average monthly wages during fifteen months.

For the loss of a first finger, commonly called the index finger, fifty per cent of the average monthly wages during nine months.

For the loss of a second finger, fifty per cent of the average monthly wages during seven months.

For the loss of a third finger, fifty per cent of the average monthly wages during five months.

For the loss of a fourth finger, commonly called the little finger, fifty per cent of the average wages during four months.

The loss of more than one phalanx shall be considered as the loss of the entire finger or thumb; provided, however, that in no case shall the amount received for more than one finger exceed the amount provided in this schedule for the loss of a hand.

*New Jersey.*—For the loss of a thumb, fifty per centum of daily wages during sixty weeks.

For the loss of a first finger, commonly called index finger, fifty per centum of daily wages during thirty-five weeks.

For the loss of a second finger, fifty per centum of daily wages during thirty weeks.

For the loss of a third finger, fifty per centum of daily wages during twenty weeks.

For the loss of a fourth finger, commonly called little finger, fifty per centum of daily wages during fifteen weeks.

The loss of the first phalanx of the thumb, or of any finger, shall be considered to be equal to the loss of one-half of such thumb, or finger, and compensation shall be for one-half of the periods of time above specified, and compensation for the loss of one-half of the first phalanx shall be for one-fourth of the periods of time above specified.

The loss of more than one phalanx shall be considered as the loss of the entire finger or thumb; provided, however, that in no case shall the amount received for more than one finger exceed the amount provided in this schedule for the loss of a hand.

*New York.*—For the loss of a thumb, sixty weeks.

For the loss of a first finger, commonly called index finger, forty-six weeks.

For the loss of a second finger, thirty weeks.

For the loss of a third finger, twenty-five weeks.

For the loss of a fourth finger, commonly called the little finger, fifteen weeks.

The loss of the first phalanx of the thumb or finger shall be considered to be equal to the loss of one-half of such thumb or finger, and compensation shall be one-half of the amount above specified. The loss of more than one phalanx shall be considered as the loss of the entire thumb or finger; provided, however, that in no case shall the amount received for more than one finger exceed the amount provided in this schedule for the loss of a hand.

*Ohio.*—For the loss of a thumb,  $66\frac{2}{3}\%$  of the average weekly wages during sixty weeks.

For the loss of a first finger, commonly called

index finger,  $66\frac{2}{3}\%$  of the average weekly wages during thirty-five weeks.

For the loss of a second finger,  $66\frac{2}{3}\%$  of the average weekly wages during thirty weeks.

For the loss of a third finger,  $66\frac{2}{3}\%$  of the average weekly wages during twenty weeks.

For the loss of a fourth finger, commonly known as the little finger,  $66\frac{2}{3}\%$  of the average weekly wages during fifteen weeks.

The loss of the second or distal phalanx of the thumb shall be considered to be equal to the loss of one-half of such thumb; the loss of more than one-half of such thumb shall be considered to be equal to the loss of the whole thumb.

The loss of the third, or distal, phalanx of any finger shall be considered to be equal to the loss of one-third of such finger.

The loss of the middle, or second, phalanx of any finger shall be considered to be equal to the loss of two-thirds of such finger.

The loss of more than the middle and distal phalanxes of any finger shall be considered to be equal to the loss of the whole finger; provided, however, that in no case will the amount received for more than one finger exceed the amount provided in this schedule for the loss of a hand.

*Oregon.*—The loss by separation of a thumb, twenty-four months, or, at the option of the workman, six hundred dollars in a lump sum.

The loss by separation of a first finger, sixteen months, or, at the option of the workman, three hundred fifty dollars in a lump sum; the second finger, nine months, or, at the option of the workman, two hundred dollars in a lump sum; a third finger, eight months, or, at the option of the workman, one hundred and seventy-five dollars in a lump sum; a fourth finger, six months, or, at the option of the workman, one hundred and fifty dollars in a lump sum.

The loss of one phalanx of the thumb shall be considered equal to the loss of one-half a thumb; the loss of one phalanx of a finger, equal to the loss of one-third of a finger, and the loss of two phalanges of a finger, equal to the loss of one-half a finger, and the compensation for the respective proportions of the above period or in the respective proportions of the above lump sum shall be payable. The loss of more than one phalanx of a thumb, or more than two phalanges of a finger, shall be considered as the loss of an entire thumb or finger.

*Rhode Island.*—For the loss by severance at or above the second joint of two or more fingers, including thumbs or toes, one-half the average weekly wages, earnings, or salary of the injured person, but not more than ten dollars nor less than four dollars a week, for a period of twenty-five weeks.

For the loss by severance of at least one phalanx of a finger, thumb, or toe, one-half the average weekly wages, earnings, or salary of the injured person, but not more than ten dollars nor less than four dollars a week, for a period of twelve weeks.

*Texas.*—For the loss by severance at or above the second joint of two or more fingers, including thumbs and toes, sixty per cent of the average

weekly wages of the injured employee, but not more than fifteen dollars nor less than five dollars a week, for a period of twenty-five weeks. For the loss by severance of at least one joint of a finger, thumb, or toe, sixty per cent of the average weekly wages of the injured employee, but not more than fifteen dollars nor less than five dollars a week, for a period of twelve weeks.

## Book Reviews

**Diseases of the Heart.** By JAMES MACKENZIE, M.D., F.R.C.P., LL.D., Ab. and Ed., F.R.C.P.I. (Hon.), Physician to the London Hospital (in charge of the Cardiac Dept.); Consulting Physician to the Victoria Hospital, Burnley. *Third edition.* Octavo; 500 pages; illustrated. London: HENRY FROWDE, *Oxford University Press.* HODDER and STOUGHTON, 1913.

It is interesting to compare the present edition with the first, published only five years ago. We find that the work has been almost entirely re-written. This indicates two things: first, that cardiac pathology is undergoing rapid and profound changes; and second, that Mackenzie, who is largely responsible for this newer impulse, still remains in the vanguard of students of cardiac disease. This edition also differs from the previous one in three particulars. First, in the clearer differentiation of the signs of disease. Here the electro-cardiogram has been of great service. Second, the bearing of heart manifestations on cardiac failure. Third, the basing of treatment on sound and scientific principles. There is hardly any need to remind the reader that Mackenzie created a new era in text-books on diseases of the heart. This edition still reveals every attribute of a great text-book, and no better tribute can be afforded it than by declaring it the most authoritative treatise on diseases of the heart in any language.

**The Early Diagnosis of Tubercle.** By CLIVE RIVIERE, M.D., F.R.C.P., Physician to Out-Patients, City of London Hospital for Diseases of the Chest; Physician East London Hospital for Children. Duodecimo; 260 pages. London: HENRY FROWDE and HODDER & STOUGHTON, 1914. Price \$2.00.

Though small in size, an extremely large amount of useful information is contained in Dr. Riviere's book. The author presents in a concise manner all the newer adjuncts used in making an early diagnosis of thoracic tuberculosis, and as he is able to speak from a very large experience, his commentaries and conclusions are worthy of careful note. The largest part of the book is taken up by a consideration of pulmonary tuberculosis in adults and the clinical and special tests used in its diagnosis. The last quarter of the book is devoted to pulmonary tuberculosis in children, especially to disease of the bronchial nodes.

The book is thoroughly up-to-date; subjects such as quantitative cutaneous tuberculin test, albumin reaction of the sputum, Gram-Much staining and pulmonary radiography are all freely discussed. It is not often that the reader gets so clear and well-presented a conception of the subject of diagnosis of tuberculosis, and we believe that this little volume may be most highly recommended.

**Diagnosis in the Office and at the Bedside.** The Use of Symptoms and Physical Signs in the Diagnosis of Diseases. By HOBART AMORY HARE, M.D., Professor of Therapeutics, Materia Medica and Diagnosis in the Jefferson Medical College of Philadelphia. *Seventh edition,* revised and rewritten. Octavo; 547 pages; 164 engravings and 10 full-page plates. Philadelphia and New York: LEA & FEBIGER, 1914. \$4.00, net.

The subtitle of this very practical and excellent work indicates its character. It consists essentially of a de-

scription from the diagnostic standpoint, under each symptom or symptom-group, of the affections marked by that symptom or regional lesion. The work follows therefore the mental processes that one actually employs in bedside diagnosis. Laboratory diagnosis is not included, but all the methods of clinical diagnosis are considered in their appropriate applications.

**A Synopsis of Medical Treatment.** By GEORGE CHEEVER SHATTUCK, M.D., Assistant Physician to the Massachusetts General Hospital. *Second edition.* Duodecimo; 96 pages; interleaved; pasteboard cover. Boston: W. M. LEONARD, 1914. Price \$1.25.

This outline of treatment is based on methods that have been employed at the Massachusetts General Hospital. It is a useful condensation or framework.

## Progress in Surgery A Résumé of Recent Literature.

THE MEETING OF THE AMERICAN SURGICAL ASSOCIATION.

New York, April 9th, 10th, 11th, 1914.

President, WM. J. MAYO.

(Next Meeting in Rochester, Minn., 1915;

President, GEORGE ARMSTRONG, Montreal.)

ADDRESSES OF SPECIAL NOTE.

*First Day.*

THE PROPHYLAXIS OF CANCER was the subject of W. J. MAYO's presidential address. Briefly considered, the points made were as follows:

Local lesions constitute an invitation to the development of carcinoma.

Between benign and malignant growths there are midway lesions in which the cells are changed but there is no invasion of the surrounding tissues.

Local lesions upon which cancer may develop may be divided into three classes:

1. Congenital neoplasms.

2. Trauma. Both carcinoma and sarcoma have been known to develop within a short time after the infliction of a trauma.

3. Chronic irritation. The well-known examples were cited of the carcinoma of the floor of the mouth in the natives of India who habitually carry a mass of acrid betel-nut leaves in this location, and carcinoma of the abdominal wall at the site of burns caused by the Kangri stoves of Thibet.

To these examples of precancerous lesions upon the surface of the body were added analogous examples of lesions occurring in the mucous membranes lining the various hollow viscera. Unfortunately such precancerous conditions give few symptoms.

Gall-stones and carcinoma of the gall-bladder are both frequent in the female. The mortality in operating for gall-stones in early cases is one-half of one per cent. at the Mayo Clinic. There were no cures in the diagnosed cases of carcinoma of the gall-bladder. There were some cures in the early non-diagnosed cases. (Early cancer in thickened sclerosed gall-bladder containing stones.)

Carcinoma of the stomach. In animals (rats) it has been observed that carcinoma of the stomach followed the habitual eating of irritating foods (cockroaches), but did not occur in those animals fed with non-irritating substances. In over 50% of the cases of carcinoma of the stomach observed at the Mayo Clinic the history pointed to the existence of precancerous lesions. In civilized man carcinoma of the stomach is a disease whose frequency is steadily increasing. A comparative study of the life habits of civilized and uncivilized men might perhaps shed some light upon the subject. For example, the meat consumption of civilized man has increased five-fold within the last century. (This mark was misconstrued by the reporters to mean that the eating of meat was a cause of cancer of the stomach.)

The comparative immunity of the small intestine to neoplasms was noted. All neoplasms of this part of the gut coming to operation early, were found to originate from pre-existing polyps or similar growths.

New growths of the appendix were found to be associated with pre-existing chronic obliteration.

In those growths of the large intestine coming to early operation pre-existing diverticula could frequently be demonstrated.

Carcinoma of the kidney and the ureter were frequently seen to follow chronic irritation from the presence of stone.

In concluding, special strength was laid upon precancerous lesions and chronic irritation.

It was urged that contrast studies be made with a view to changing deleterious habits. The early removal of precancerous lesions was strongly advised.

THE COLEY'S FLUID TREATMENT OF SARCOMA, especially sarcoma of the long bones, was discussed by its originator. He, as well as many of those who joined in the discussion afterwards, cited cases of sarcoma which had recovered and stayed well for a long period of time, even up to twenty years after the recovery of their existence. Especially interesting were some cases in which the growth at first disappeared, to recur after ceasing the administration of the "toxins", to disappear for a second time after their readministration.

The consensus of opinion was that in only a very small portion of the cases were the toxins observed to be of any use (much less than 1% of the total). Sarcomata has been known to regress spontaneously, although very rarely. Whether the cases which have recovered under the toxin treatment would have gotten well of their own accord cannot be determined. In any case, with such a hopeless prognosis, the toxins should be tried faithfully and for a long time. (The patients frequently become restless under the treatment because of the disagreeable symptoms it gives rise to, such as high fever, chills, general malaise, loss of weight, etc.)

In the session devoted to STOMACH SURGERY and INTESTINAL STASIS, RODMAN, of Philadelphia, again urged the importance of removing the ulcer-bearing area to avoid the dangers of cancer-formation, relapse of symptoms and later hemorrhage. In the discussion it was held that the mortality from cancer-formation after gastro-enterostomy, without pyloric resection, may be less than the difference in the primary mortalities of pylorotomy and the less radical procedure. In support of Rodman, LILIENTHAL, of New York, recommended pylorotomy in two stages as a means of reducing its operative mortality.

STEWART, of Philadelphia, reported a new method of gastro-enterostomy, too technical to describe here.

#### *Second Day.*

THORACIC SURGERY. CARREL, of New York, reported his EXPERIMENTAL OPERATIONS on the ORIFICES OF THE HEART. The blood flow through the heart of dogs can be safely stopped (by clamps) for two minutes or a little more, which allows enough time for plastic work on the valves. ARMSTRONG, of Montreal, reported a case of auricular fibrillation from foreign body in the pericardium.

REHN, of Frankfort, in discussing Armstrong's paper, advised avoiding injuries to the pleura in exposure of the heart whenever this was possible because of the danger from infection. He advised a mediastinal instead of the intrapleural exposure. After transverse division of the left rectus close to its thoracic attachments, the sternum is split from below upwards as far as is necessary. If the thorax is elastic, vigorous retraction of the divided halves of the sternum will afford sufficient room. If not, the sternum can be transversely divided at the upper end of its vertical division. Among the conditions in which this approach may be useful, are injuries of the heart, the Trendelenburg operation, pericardial plastics, and DeLorme's operation. Rehn cited an especially interesting case of gunshot wound of the right ventricle in which the longitudinal splitting of the sternum afforded exposure of the wounded heart within a few moments. There was profuse hemorrhage. Manual compression of

the superior and inferior venæ cavæ promptly effected hemostasis. The rent in the heart wall was sutured and the patient made an uneventful recovery.

STEWART, of Philadelphia, reported an autopsy two years after suture of the heart in which the left coronary had been tied during repair of the cardiac wound. The territory distal to the site of ligature was thin and dilated.

HENSCHEN, of Zurich, reported favorably upon the strengthening of fusiform aneurisms by the external application of strips of fascia lata according to the method of Halstead and Kirschner.

MURPHY, of Chicago, referred to twenty-three (2,300) hundred establishments of artificial pneumothorax.

ROBINSON, of Boston, advised artificial pneumothorax as a preliminary step to excision in early bronchiectasis.

FRED MURPHY, of St. Louis, advised the employment of local anesthesia wherever possible.

RIXFORD, of San Francisco, called attention to the fact that pneumothorax upon the left side is much more poorly borne than that upon the right.

"Visceral pleurectomy for chronic empyema," by CHARLES MAYO and BECKMAN, of Rochester, Minn. (read by Beckman), was discussed by Ransohoff, of Cincinnati, who pointed out the advantage of numerous longitudinal incisions through the thickened membrane covering the lung. It could be observed that, after each incision, the underlying lung tissue promptly expanded. The more incisions, the more expansion. Similar horizontal incisions resulted in still further expansion of the confined lung. This method was simpler and less tedious than the systematic decortication of the lung.

LUND, of Boston, described a simple and ingenious method of valvular drainage for empyema. A skin flap with its hinge uppermost exposes parts of two ribs. A convenient amount of the upper rib is resected and the pleural cavity is opened in the usual manner. An obliquely cut drainage tube is inserted into the pleural opening and is led downwards to overlie the second rib. Its outer end is cut off obliquely so as to be flush with the chest wall. The lower edge of this tube is firmly attached to the lower margin of the wound by several sutures. The skin flap is now allowed to fall in place and acts as a valve permitting the egress of pus but preventing the ingress of air. Lund states that this method had been used with success in only two or three cases but believes it is worth a trial.

KÜMMELL, of Hamburg, reported a most interesting case of aneurism of the descending thoracic aorta. Generous sections from five ribs (sixth to ninth) on the left side were made. The pleura was separated from the thoracic wall toward the vertebral column with comparative ease, exposing the aneurism and the aorta above and below it. An assistant inserted his hand into the thorax above the aneurism and compressed the beginning of the descending aorta. The aneurismal sac was then split wide open, the clots were cleaned out and it was found that a longitudinal slit several centimeters long communicated with the aorta. This slit was closed by suture and the redundant sac was excised. The patient made an uneventful recovery.

HARTMANN, of Paris, presented experimental evidence showing that the stoma of a gastro-enterostomy, if situated near the cardia will not functionate if the pylorus is open, while if near the pylorus it will functionate even though the pylorus is patent.

FINNEY, of Baltimore, in the discussion, reported a case of total obliteration of the pylorus and almost complete obliteration of the gastro-enterostomy performed five years previously by A. G. Gerster.

GERSTER, of New York, called attention to the fact that the gastro-enterostomy had been made with a Murphy button and that cicatricial contraction of anastomoses made with the button were not infrequent.

MURPHY said that an oval button now in vogue afforded a larger opening.

#### *Third Day.*

### SPLENECTOMY FOR VARIOUS BLOOD CONDITIONS.

RANZI, of Von Eiselsberg's Clinic in Vienna, reported twenty splenectomies. The three patients operated upon



for hemolytic icterus made excellent recoveries, gaining from seven to twenty-four pounds. Of five cases of pernicious anemia in which the spleen was removed, one died of pneumonia, four improved markedly. Three, previously bed-ridden, could walk again and all gained some weight. Of the nine patients whose spleen had been removed for Banti's disease, seven were quite well. The oldest operation was two years ago. Three other cases were operated upon for splenomegaly following an indefinite type of chronic sepsis. Practically the same report appeared in the last number of the *Zentralblatt für Chirurgie*, 1913, page 2004.

FINNEY reported three splenectomies, two for pernicious anemia, one for Banti's disease. All three patients did well.

**INTRAVENOUS ANESTHESIA:** Report by KÜMMELL, of Hamburg. In 6,000 operations a year intravenous anesthesia was used in 300 selected cases. There were special indications. First, topographic, i. e. in operations upon the head, especially the mouth, tongue and hypophysis. Second, in debilitated patients, especially those suffering from carcinoma, sepsis, shock, or exsanguination. (In a hundred operations for ectopic gestation all were saved.)

With proper technic there should be no fear of local thrombosis or consequent embolism. To avoid local thrombosis there should be a continuous gentle flow of salt solution through the canuls into the veins. The effects of intravenous anesthesia upon the kidneys, lungs and heart are no worse than those of general anesthesia. In Kümmell's Clinic two litres of normal saline solution are administered intravenously after all severe operations.

**Technical Details:** There is a stand holding three containers, one with normal saline solution, one with 5% ether in normal saline solution and one with isopral. Anesthesia sets in within one and a half to ten minutes after it is begun. As soon as the patient is well under, the administration of the ether solution is stopped, and a gentle stream of salt solution keeps the blood in motion past the canula. In very powerful or in alcoholic patients isopral is employed to initiate the narcoses which is then continued with the ether solution.

**Amount of ether used:** Eighty-seven grams of ether were used for maintaining anesthesia during resection of the cardia for carcinoma, which took two hours. Three litres of fluid and sixty grammes of ether were used in the operation for aneurism of the descending aorta referred to above. In tuberculous cases the intravenous anesthesia has no disadvantages. The rapid awakening and rarity of vomiting are additional advantages. (Isopral is used in one and one-half per cent. solution.) Veronal is untrustworthy for this purpose. Hedonal is used by the Russians.

E. WYLLIS ANDREWS, of Chicago, employs the intravenous anesthesia for operations of from three to six minutes' duration. He points out that the method has certain limitations. That five per cent. ether solution frequently fails to induce anesthesia and that ten per cent. is dangerous because of its tendency to leaking the blood and to thrombus formation. He believes with Kümmell that its employment is indicated in selected cases.

**RADIUM IN MALIGNANT DISEASES.** SPARMANN, of Von Eiselsberg's Clinic, in Vienna, reported on forty cases of inoperable malignant disease. The Eiselsberg Clinic owns 225 milligrams of radium and 150 milligrams of mesothorium. Both external and internal applications were made. At first large doses up to 11,000 milligram-hours were employed. Recently these have been reduced to 1,100 to 2,000 milligram-hours.

The hopes entertained at first were not realized. Eleven out of the forty cases only showed improvement and these were in superficially located lesions such as the tongue, the axilla and the skin. In some, recurrence was even hastened by employment of the radium. There is no specific action upon the tumor itself, only a local action.

ABBE, of New York, in the discussion reported employing radium for the past eleven years in over one

thousand cases and quoted several cures in superficially located lesions.

Sparmann, in closing, again stated that radium has been beneficial only in superficial lesions and that isolated examples of cures do not furnish sufficient grounds for making any general rules.

#### FOURTH TRIENNIAL CONGRESS OF THE INTERNATIONAL SURGICAL ASSOCIATION.

New York, April 13th, 14th, 15th, 16th.

President of the Congress, A. DEPAGE, Brussels.

President of the Association, CHARLES WILLEMS, Ghent.

(Next Congress, Paris, September, 1917;

President, WM. W. KEEN, Philadelphia.)

At the opening session addresses of welcome were delivered by Surgeon-General GORGAS, U. S. A., representing the President of the United States, WM. J. MAYO, president of the American Surgical Association, and L. L. MCARTHUR, of Chicago, chairman of the American Committee of the Association, in place of Roswell Park, recently deceased. The address of the president of the Association, Professor WILLEMS, read, in his absence, by the secretary, J. P. HOGNET, of New York, was supplemented by an address of the presiding officer, Professor DEPAGE, also in French.

**AMPUTATIONS,** the topic of the first scientific session, perhaps suggested by the Balkan wars, were discussed in their various phases by WITZEL, of Bann; BINNIE, of Kansas City; DURAND, of Lyons; RANZI, of Vienna; DEPAGE, STEINTHAL, of Stuttgart; MORESHU, of Paris; PRANKE, of Braunschweig; LORTHIOR, of Brussels; LAMBOTTE, of Antwerp; RITTER, of Posen, and others.

In these papers and discussions, to consider them as a whole, especial attention was given to the means of providing painless, weight-bearing and serviceable stumps, and to the after-treatment. High section of the nerve trunk was emphasized as important by Wilms, and fixation of the nerve on the bone section was also recommended. In the treatment of the end of the bone were discussed the comparative indications of the methods of Bier (osteoperiosteal flap closure) of Wilms (closure by tendon flap) and of Hirsch-Bunge (removal of periosteum and endosteum). Bunge's method was considered best in military practice and in such other cases as cannot expect primary wound-healing. Steintal showed lantern slides illustrating conical stumps following faulty technics, and painful osteophytes growing from redundant periosteum flaps. Binnie suggested free transplantation of a bone fragment to the end of the long bone as technically simpler than Bier's method. Witzel advocates an "extension overband", i. e. traction upon the dressing covering the stump rather than compression. This is maintained for ten days. Then massage is begun, active movement is made at the end of two weeks and the patient is encouraged to stand upon the stump at the end of three weeks. He should stand on it at the end of four.

The method of Vanghetti, viz., the preparation of loops of tendon covered by and lined with skin, was mentioned as of service in stumps of the upper extremity, to provide attachments for manipulating protheses. Far better than this, however, is the remarkably ingenious Carnes artificial arm, demonstrated by Binnie on three men who had high amputations. One of these men had a stump of humerus scarcely two inches long, yet he, like the other two, by jerking his shoulder in various directions could make his artificial hand and fingers perform astonishingly, e. g., write, pick up a coin, seize and lift a satchel by its handle, pick up a cigarette and lift it to the lips, etc. The demonstration of this remarkable, and mechanically not very complicated, artificial arm was, we think, the most interesting and most impressive feature of the discussion on amputations.

#### Second Day.

In the symposium upon GASTRIC AND DUODENAL ULCERS, papers were read by DE QUERVAIN, of Basel (by title); HARTMANN, of Paris; LECÉNE, of Paris; W. J. MAYO, and PAYR, of Leipsic. Nothing new was brought out. Hartmann and Lecéne stated that about 20% of callous ulcers

showed carcinomatous degeneration and they, as well as Payr, believe that callous ulcers should be excised. Payr holds that of pyloric exclusion methods only von Eiselsberg's can be relied upon. Several of the points made in Mayo's paper were referred to in an editorial in the *JOURNAL*, April, 1914, page 164.

MURPHY, of Chicago, referred to Rosenow's well-known work on the etiology of gastro-duodenal ulcers, namely, the isolation of strains of streptococci from the depth of gastro-duodenal ulcers in human beings and the experimental reproduction of such ulcers in dogs by the injection of strains of these streptococci.

### Third Day.

LEXER, of Jena, read his paper on "*Grafting and Transplantation*." This was easily the best address of the entire meeting.

**General Points:** As regards free transplantation Lexer stated that the ideal healing required by pathologists was not necessary. If the result was a good functional one, there could be no complaint on the part of the surgeon.

Resorption and substitution should balance one another. At times this did not occur when resorption took place too rapidly.

The technical requisites for success are a healthy transplant and favorable soil. As regards the latter, *absolute hemostasis* is necessary in order to insure contact with the living cells.

The connective tissue derivatives are the only ones suitable for homoplastic transplantation. Heteroplastic transplantations are not good.

As regards the *homoplastic* transplantation of skin, there were no definite conclusions. It had been attempted to accustom the transplanted skin to its new soil by daily injections of the donor's serum under the transplanted flap.

Homoplastic transplants are sooner or later thrown off, either (1) by supuration or (2) forming a scab which is cast off after a while, or (3), best of all, by scar formation, when the transplant is invaded by connective tissue cells which ultimately take its place. This occurs about the end of the fifth week (i. e., no homoplastic transplant lasts longer than five weeks).

**Autotransplantation.** The transplantation of skin from one part of an individual to another requires no further mention. The transplantation of hairy skin for cosmetic purposes (such as making new eyebrows or a new moustache) has been successfully done. Lexer's lantern slides showed some splendid examples of this.

The *subcutaneous cellular tissue* (epidermisloser Haut) has been proven most useful, especially in plastics of the face, such as the modelling of a new external ear or improving the point of a snub nose.

**Mucous membrane** has also been successfully transplanted. Examples: blepharoplasty; the substitution of the appendix for part of the urethra (an 8-centimeter defect) which has functionated for the past year without ever having been sounded.

**Tendon transplantation.** Here early movement is of prime importance. Putting the newly transplanted tendon under tension stimulates regeneration. It regenerates from its own tissues. The skin should be tunnelled, not laid wide open. Lexer showed some remarkable substitutions of the flexor tendon of the fingers. All the work was done from an incision in the palm and one at the tip of the finger. The palmaris longus tendon was used, the end of the profundus was found in the palm and was brought out through the incision in the palm. By tunnelling the skin of the finger the new tendon, attached to the profundus stump in the palm, was led out to the tip of the last phalanx and sutured there. The transplant from the end of the sublimis in the palm was split, led to, and attached to either side of the middle phalanx. A ring worn at the inter-phalangeal articulation served well as an annular ligament, or, an annular ligament could be made by a small transverse plastic of the skin on the flexor aspect of the inter-phalangeal joints.

**Fascial Transplantation** could be employed anywhere in the body except for closure of defects in the dura or the pleura. Here it should not be used, because of

the great connective tissue growth it gives rise to. Example: A boy with congenital ptosis had the margin of his upper lid attached to the frontalis muscle above the brow.

**Fat.** In transplants of fat it is important to take a larger piece than seems absolutely necessary because of the subsequent shrinkage. All handling of the fat must be done with the utmost gentleness. Fat is most useful for surrounding tendons or nerves previously adherent after they have been freed (tendo and neurolysis) to prevent subsequent adhesion. Excellent results may be obtained by the implantation of fat between the articular surfaces of those joints which do not bear weight. As to its implantation in the weight-bearing joints, the results are inconclusive at present.

Fat is also excellent for closing defects in the dura, the pericardium and the pleura. The endothelial cells in the fat grow out upon its surface. Lantern slides (Lurniere plates) of fat flaps covering defects of dura were shown. A fat transplant filling the defect in a facial hemiatrophy was also shown.

**Vessel transplantation** is well known.

**Cartilage transplantation:** The cartilage should be transplanted together with its perichondrium. Regeneration takes place both from the perichondrium and the center. Homo-transplantation of cartilage is not good. Examples were shown of cartilage transplantation for the fashioning of a new ear in a case of congenital absence of the external ear.

**Joint Transplantation.** At first the transplantation of one articular surface was tried. It proved so successful that the transplantation of an entire joint was next attempted. Lexer did this for the first time in 1907. The articular surfaces and about one inch of the adjacent bone on either side of the joint were transplanted. The spongiosa of the bone was shown to be absorbed on the X-ray plate and the joint resembled one affected with arthritis deformans. In more recent work the transplant consisted mainly of the cartilaginous articular surfaces with very little underlying bone. There is not more than twenty degrees' motion in any of these transplanted joints. In the knee joint, the two articular surfaces and the crucial ligaments are transplanted. The lateral ligaments are not. The bony ends of the recipient's femur and tibia are barely denuded of their cartilage so that the new cartilaginous coverings accurately fit them.

Lexer spoke of some recent experimental work regarding the adaptation of the host to the transplant. He cited the well known fact that a piece of bone transplanted from one animal (dog) to another (rabbit), if the operation is aseptically done, heals in, becomes encapsulated and lies in a bed of granulation tissue from which it can easily be lifted out. If, on the other hand, the recipient (rabbit) is previously treated with bone extract from the donor (dog) before transplantation is done, and following this, the recipient is injected with the donor's serum from time to time, the bone heals in and shows no tendency to encapsulation or resorption. There is intimate contact with the surrounding connective tissue cells and the bone cells seen at the center of the transplanted piece show no degenerative changes. Microscopical sections of bone from control and treated animals several months after transplantation showed striking control.

The lantern slides which Lexer presented showed him to be a plastic surgeon of the very first rank.

In the discussion which followed, Rehn, Lexer's assistant, showed some experimental work with tendons fashioned from subcutaneous connective tissue. The strips of subcutaneous connective tissue are wound around a strand of silk.

On Thursday, April 16th, DR. ALVIN LAMBOTTE, of Antwerp, in the presence of a few surgeons especially interested in bone surgery, plated the fractured femur of a 14-year-old child at the French Hospital. It was a comparatively simple case—a transverse fracture of the middle third of three days' standing.

Lambotte followed the same general principles known in this country as those of "Lane technique." He made a very generous incision upon the outer aspect of the

thigh. The upper fragment's end was readily exposed; this was drawn upward and outward by a bone hook. The end of the lower fragment was then easily exposed. Both fragments were grasped with the Lambotte bone-holding forceps. The limb was then kinked at the site of fracture by an assistant (Dr. Turnure), the ends were exactly coapted and the limb was straightened out. A third clamp now grasped both fragments at the point of fracture, a plate was introduced into the wound and was accurately applied to the bone. (Lambotte's plates are oval and have a transverse concavity on cross section. This shape gives great strength with comparatively thin material. The screw holes are spaced at one-fourth inch intervals from one end of the plate to the other. The Lane plates of latest pattern also have this feature of multiple holes. The advantage of this is that it permits greater latitude in placing the screws to meet the individual requirements of the case.)

Instead of leaving the center clamp to hold the plate in place, Lambotte then reapplied the two original clamps in such a manner that they held the plate and retracted the soft parts to the upper side of the wound. Holes were drilled and his own type of self-tapping screws were then inserted. Large through-and-through sutures of silk roughly approximated the tissues. The skin margins were united by a running suture. The limb was put up in a retentive dressing (gauze next to the wound, then towels, then a bandage) in such a way that the knee was acutely flexed, the foot almost touching the nates. (Passive and active motions are begun on about the fifth day.) The operation was done with great neatness and celerity but without the slightest hurry. It was eighteen minutes from the incision of the skin to the driving home of the last screw; six minutes more were occupied for closing the wound—twenty-three in all. Every move showed the operator a finished technician.

The operation was so simple that the operator's crutch and lever for overcoming shortening and the plate-holding attachment of his most recent bone-holding forceps were not brought into play.

The versatility of Lambotte is phenomenal. His equipment allows one not only to plate, but also to bolt together the fragments of a comminuted fracture, to encircle and bind together the halves of a long oblique fracture ("cerclage") and to combine any of these methods with any other. He has many more resources at his command than has Lane.

Most of the foreign members of the International Surgical Congress left New York for Philadelphia late on Thursday, the 16th, for a brief tour of the East and Middle West, as follows: Friday, April 17th, was spent in Philadelphia; Saturday, the 18th, in Baltimore; Sunday, the 19th, in Washington. Late Monday, Chicago was reached. Wednesday and Thursday, the 22nd and 23rd, were spent at Rochester, Minn. From there the return journey began. After brief stops at Niagara Falls, Toronto, Montreal and Boston, the visitors reached New York late on Tuesday, the 28th, sailing for Europe the next morning.

#### Rupture of the Intestine, With Special Reference to Its Early Diagnosis. M. KAHN, Leadville, Colo. *Journal of the American Medical Association*, March 7, 1914.

Maurice Kahn remarks on the high mortality of intestinal rupture and the manner in which it may occur, and reports several cases observed by himself. The necessity of early operation is especially insisted on, as the surgical technic is fairly successful when early operation is performed. There is no better method of insuring the patient's death than masking symptoms by morphin and waiting for the absolute diagnostic signs of the injury. Hence he gives a detailed list of the symptoms. Shock varies from slight to most profound, and its absence signifies nothing. Vomiting is common, but not invariable, and the more persistent it is the more important. It is due to irritation of the peritoneum, which, when sufficient to cause it, may be long delayed, especially if the intestinal content is expelled directly into the pelvis. Obstipation

is very common, and is not so useful as a sign as we have it in the picture of traumatic or paralytic ileus. Frequent urination has been observed, but it is rare and a late symptom. Pain is usually intense, local or general, more often the latter. It appears early and continues unabated. The difference in patients enduring pain has to be considered in estimating this symptom. The respiration is said to be characteristic and of thoracic type and shallow. Kahn has not seen this early enough to be of value. If present it will be significant, but its absence means nothing. The pulse, at first, is usually slow and gradually and steadily rises, though exceptionally this is delayed. An increasing pulse-rate is a valuable symptom, but it may be too late. The temperature is but slightly elevated at first and not dependable for early diagnosis. Formerly the facial expression was considered of importance, but generally when it is noticed it is too late to be of value. Loss of liver dullness is also a late sign and may be simulated by a marked meteorism. Abnormal areas of dullness may appear from hemorrhage, but otherwise they would be tardy in appearance; as an early symptom local dullness is not of importance, as there would be other characteristic symptoms accompanying it. Rigidity of abdominal muscles is an invaluable sign in a suspected case and is not subordinate in importance to any other. Local tenderness is of great value if superficial injury can be excluded, and its increase in severity and area are rapid in cases of rupture. The longer the time after the accident and the more numerous and marked the symptoms the surer is the diagnosis and the greater the danger to the patient. Once the diagnosis is made, the importance of prompt action cannot be overemphasized. The history may be misleading, but it is still of primary importance, and with it the persistence of the initial symptoms, especially rigidity and pain, are sufficient at least to warrant an exploratory operation.

#### Spontaneous Rupture of the Spleen in Typhoid Fever, With a Report of a Case Cured by Operation. (Splenectomy.). L. A. CONNOR and W. A. DOWNES, New York. *American Journal of Medical Sciences*, March, 1914.

The patient, aged 36 years, was admitted to the hospital with what appeared to be a mild typhoid; the only unusual clinical feature was an unusually large spleen, which reached 4 cm. below the costal border. About the ninth day the patient complained of severe pain in the splenic region; this continued for a few days and then gradually subsided. The pain was not attended by any grave clinical phenomena. On the 12th day, following an attack of coughing, the patient was suddenly seized with severe pain in the left hypochondrium and shoulder; the patient's condition became worse, the pulse was rapid and small, the upper left quadrant of the stomach was rigid and tender and there was dullness in the left flank. A diagnosis of rupture of the spleen was made and about five hours after the onset of the symptoms the spleen was removed. A tear in the capsule about three inches in length was found and the abdomen contained about a quart or two of blood. The patient did well and was discharged from the hospital five weeks after operation. An interesting feature of the case is the finding of a laminated clot on the surface of the spleen indicating that a rupture had taken place during the first attack of pain from which the patient had apparently recovered. The subsequent rupture was in all probability due to the attack of coughing. The report concludes with a study of all the previously reported cases of rupture of the spleen during typhoid fever.

#### An Anatomic and Physiologic Method of Short-Circuiting the Colon. J. R. EASTMAN, Indianapolis. *Journal of the American Medical Association*, March 17, 1914.

Eastman says that anastomosis of the caput coli at its lowest level with the rectum as a means of short-circuiting the large bowel presents all the advantages and eliminates many of the evils of the operative procedures now in use. Ileosigmoidostomy does not always drain the cecum, and while anastomosis of the terminal ileum with the rectum is somewhat more efficient, the pus formation at the blind end of the ileum, described by Werelius, may defeat the object of the operation and reversed peristalsis favor retention of fermenting food and bacteria. If the caput

coli is anastomosed freely to the rectum at the lowest point possible without traction, the emptying of the cecum is favored at this point, also where direct drainage is most needed. The Murphy button may be used and is here quite safe, as it will be readily discharged here. To insure anastomosis of the most dependent part of the caput coli, the appendix should be removed if it is necessary to secure perfect drainage.

**The Treatment of Fracture of the External Malleolus.**  
SIR J. BLAND-SUTTON, London. *Lancet*, February 7, 1914.

Fractures of the external malleolus often lead to impairment of movement of the ankle joint. This is due to the fact that the fracture opens the joint and the subsequent callus formation leads to a chronic inflammation of the joint. Bland-Sutton reports three cases in which he removed the detached malleolus, and obtained a quick convalescence and perfect function in each. The support which the malleolus normally gives the ankle joint is restored by a thick fibrous mass of tissue. This measure carries out a principle of Bland-Sutton's which he has long practiced, namely, the removal of small fragments of the detached bone in fractures involving joints.

**A Simple Subcutaneous Cut to Cure "Trigger-Finger" or "Snap-Finger."** ROBERT ABBE, New York. *Medical Record*, March 7, 1914.

Abbe explains this condition as due to a crumpling up of the conjoined flexor tendon by a transverse band of fascia situated beneath the distal flexure crease of the palm. In order to cure the condition, Abbe recommends longitudinal incision of the fascia for a distance of about half an inch through the flexure crease. In one case, this simple incision proved efficient.

**Periarticular Suppuration of Pure Gonococcic Origin.**  
DEWITT STETTIN, New York. *Archives of Internal Medicine*, January, 1914.

A periarticular suppuration of pure gonococcic origin may exist which may simulate an ordinary pyogenic tendosynovitis or cellulitis. It apparently follows an arthritis of the neighboring joint, which in itself may be non-suppurative. The articular and periarticular lesion may be absolutely distinct anatomically.

The history of a gonorrheal infection, the existence of a urethritis, the previous articular lesions, the absence of an external point of entry for the infection, and the presence of gonococci in the urethral or vaginal secretions may suggest the diagnosis. The certain diagnosis is made by the finding of gonococci, preferably demonstrated by culture, in the purulent exudate.

The condition is subacute and offers a good prognosis if the pus focus is promptly incised and the systemic infection combated by proper vaccine therapy.

Baur's contentions that in gonorrheal rheumatism, the gonococcus does not live after the sixth day of the disease and that the gonococcus cannot exist in the soft tissues around the joints are both conclusively disproven.

**Perimyositis Crepitans.** A. E. HOAG and MAX SOLETSKY, New York. *Journal American Medical Association*, March 14, 1914.

A case of perimyositis crepitans is reported by Hoag and Soletsky, who review the three previously reported cases. The patient was a medical student, who had done a great deal of concert piano-playing which caused him a great deal of mental as well as physical strain. For six months he had noticed a crepitation of the muscles in the upper back along the left side and also in the neighborhood of certain joints. The pain was felt only on exertion. Röntgenoscopy revealed no calcification or anomalies in the joints. Crepitation was felt by placing the hand over the scapular muscles and having the patient put them on the stretch. This was also felt over the vertebral muscles and the angle and wrist joints. An examination of muscle sample showed localized thickening in the aponeurosis and muscle caused by hyaline swellings. The case seems to be the only one in which microscopic and pathologic examinations were made. Hoag and Soletsky conclude as follows: "The cause of this lesion is overexertion resulting in small

areas of rupture in the muscle and the aponeurosis, which are followed by minute hemorrhages and then hyaline thickenings. These thickenings cause a creaking when the two surfaces rub together. If there is any fibrin present it is absorbed very early."

**Observations on Acute Hemic Infections of the Kidney.** G. E. BREWER, New York. *The American Journal of Urology*, December, 1913.

This paper, one of the opening addresses at the recently held International Congress of Medicine, is largely a résumé of Brewer's previous contributions to the subject. He finds close analogy to the difficulty in inducing experimental ascending nephritis in his clinical experience. "Even in septic conditions of the lower urinary passages the concomitant renal lesion may be of hematogenous origin." During the progress of any acute infectious disease many of the bacteria that enter the blood current are excreted through the kidneys. No demonstrable lesion results if they are few in number, their virulence low, and the kidneys healthy. If one of these three elements is lacking, typical lesions are produced. They may result in a rapidly fatal symptom—complex or in a slower evolution of one of the types of renal suppuration. Though the disease is often bilateral it is frequently unilateral, in the kidney that has a diminished resistance to infection. This may depend upon previous disease, calculus, hydro-nephrosis, hyperemia, etc.

**A Practical Method for Determining the Amount of Blood Passing Over During Direct Transfusion.**  
E. LIBMANN and R. OTTENBERG, New York. *Journal American Medical Association*, March 7, 1914.

The importance of an accurate method of estimating the amount being transfused in blood transfusion is pointed out by Libmann and Ottenberg. It is of importance from two points of view: (1) in order to avoid any danger to the donor from loss of blood; (2) to determine when the patient has received enough for the desired therapeutic effect. From previous studies they have found that variations in blood or pulse-rate are too irregular to be of use, but the rise in percentage of hemoglobin when the patient's hemoglobin is low, is susceptible of pretty accurate measurement. If two fluids having different percentages in solution are mixed in unequal volumes, the percentage strength of the resulting mixture is the sum of the products of volume multiplied by the percentage of each solution, divided by the volume of the total mixture. In order to calculate the exact amount of blood and not merely the relative volume transfused, it is necessary to know the blood volume of donor and patient. Great accuracy in this is at present impossible, but a large number of experimental observations by various authors have shown that blood volume bears a rather constant relation. It has recently become clear that the original estimate of Welcker, that human blood-weight is approximately one-thirteenth of the body-weight, is wrong, and that the actual blood volume is more nearly one-nineteenth of the body-weight. The authors' observations and experience indicate that if more than one-quarter of the donor's blood is taken, symptoms of collapse, ordinarily of short duration, are apt to supervene. The donor should be sharply watched as soon as the hemoglobin rise in the patient nears a point that indicates that nearly one-quarter of his blood has been transfused. Warnings in the literature as to danger of acute dilatation of the patient's heart from excessive transfusion led the authors at first to make a similar calculation as to the amount of blood a given patient could receive. Experience, however, has taught them that such calculation is necessary only when there is a disparity in size between the donor and patient. Usually the circulation adjusts itself rapidly to the increased blood-supply. There are several possible sources of error mentioned. The first, of course, is due to loss of blood in acute hemorrhage. When the hemorrhage is recent enough to permit an opinion as to the amount lost, allowance can be made for this. But when the loss has occurred from twelve to twenty-four hours before the transfusion, it is probably unnecessary to make the allowance. Another source of error which is present in practically every case and for which it is impossible to make an allowance, is the absorption of plasma from the circulation by the tis-

sues. The authors' experiments, however, when accurate weighings of donor and patients were made, showed that while these sources or error may exist, in most cases they are not large enough to affect materially the results of the calculation. They say in conclusion: "1. It is as necessary to control the amount of blood transferred during a direct transfusion as it is to control the dosage in any other therapeutic procedure. 2. A simple arithmetical formula is given by which it is possible to calculate how much rise in the percentage of hemoglobin will be obtained by transfusion of a given volume of blood. The formula is:

$$\frac{[(\text{Patient's blood-weight} \times \text{patient's hemoglobin per cent})] + (\text{Weight of blood transfused} \times \text{donor's hemoglobin per cent})}{[\text{Patient's blood-weight} + \text{weight transfused (in pounds)}]} = \text{hemoglobin per cent reached.}$$

"The patient's blood-weight is estimated as one-nineteenth of the body-weight. 3. The amount to be transfused may be decided arbitrarily, with regard to the patient's need, or with regard to the donor's ability to give up blood. 4. It is always safe to take one-fourth of the donor's blood; it is often safe to take as much as one-third of the donor's blood volume, provided the transfusion is not done too rapidly. 5. Though the danger of overloading the circulatory system of the patient is not as great as has been thought, yet probably it is not wise to add more than one-fourth, or at most one-third, as much blood as a person of the patient's weight normally has. This needs to be taken into account only in children or very small adults, transfused from large donors, because in most cases a single donor will collapse before he can give enough blood to embarrass the circulation of a full-grown adult patient. If more than one donor is used, this part of the circulation becomes of great importance. 6. By means of exact weighings of either donor or patient, or both, before and after transfusion, in a series of eleven cases, we have shown that the formula which they give corresponds quite closely to the actual amount of blood transfused. 7. By using this calculation as a guide and determining before each transfusion the point to which the hemoglobin ought to be raised, it is possible to avoid untoward symptoms in either the donor or patient. We have demonstrated this in a large number of transfusions."

**A Study of the Pathology of the Thyroids From Cases of Toxic Non-Exophthalmic Goiter.** LOUIS B. WILSON, Rochester, Minn. *The Journal-Lancet*, February 15, 1914.

The pathology of the thyroid in true exophthalmic goiter is essentially a primary parenchymatous hypertrophy and hyperplasia, i. e., an increased amount of functioning parenchyma associated with an increased absorption. The process is an acute one. The pathology of atoxic simple goiter is marked essentially by atrophic parenchyma, decreased function and decreased absorption. The process is a chronic one. The pathology of those cases of toxic goiter that resemble exophthalmic goiter is one of increased parenchyma through regenerative processes in atrophic parenchyma, or the formation of new parenchyma of the fetal type with an increase in each instance of secretory activity and of absorption. The nearer the cases of this type approach in age and symptoms true exophthalmic goiter, the shorter the duration of the period of goiter before operation, and the smaller the average weight of the gland at the time of its removal.

The cases of toxic goiter in which the symptoms are of the cardiovascular variety much more closely resemble cases of simple goiter in their pathology. A larger number of them is of the colloid type; the enlargement of the thyroid has existed for a longer period before operation, and the portion of the gland removed is materially larger than in the cases resembling the exophthalmic variety. All the above pathologic evidence points to a constant relative association of increased secretion and increased absorption from the thyroid, proportional to the degree of intoxication of the patient.

**A Consideration of Our General Anesthetic Agents, Ether and Nitrous-Oxide-Oxygen.** WILLIAM C. WOOLSEY, Brooklyn, N. Y. *Long Island Medical Journal*, February, 1914.

Only ether and nitrous oxide are considered since these are the anesthetics of choice.

Operative surgical shock may be etiologically divided into (a) that caused by anesthesia, toxemia direct and indirect, (b) that caused by hemorrhage or similar serious coincident factors of operative invasion, (c) that caused by the actual afferent nerve trauma of surgical procedure. If the second group be omitted, the author believes that 90 per cent of operative shock cases are really anesthetic shock. Many of these cases are due to faulty administration of the anesthetic. The commonest error is that of not permitting sufficient oxidation of the blood during administration of ether. Cyanosis ought not to be present; if it is, it points to obstruction of the entrance of air, at the base of the tongue, at the glottis, at the lips or finally in the trachea, where mucus or vomitus has collected.

The author believes that the question of dosage is much simplified by the use of the anesthesiometer, especially in institutions where comparatively inexperienced men are frequently being broken in as anesthetists.

Nitrous oxide and oxygen becomes a proper agent for general surgical narcosis only when it is utilized in one of two ways: (a) as an adjunct to complete local analgesia where only its most superficial effects are necessary, while the local anesthetic cuts off wholly the field of operation, or (b) where it is skillfully supplemented by enough ether to bridge over the more severely traumatic stages of the operation.

**Roentgen Stereography in the Diagnosis of Urinary Calculi.** E. W. CALDWELL and H. M. IMBODEN, New York City. *New York State Journal of Medicine*, March, 1914.

1. The only disadvantages of stereography of the urinary tract as compared with the ordinary single plate method examination are the increased technical difficulties and the greater expense. Accuracy in these examinations is of such great importance as to justify the increase in expense and in labor necessary for the stereoscopic method.

2. Stereography reduces to a minimum the errors from the following sources:

(a) Artifacts in the plates resembling stone which may appear in one plate but not in two in the same place.

(b) The mistaking of extra-urinary bodies for calculi.

(c) Overlooking the shadows of calculi which are superimposed on bone shadows, especially the heavy stones of the pelvis.

(d) The knowledge of depth and perspective which these stereoscopic examinations present gives confidence in the estimation of the size, outline and position of the kidneys.

**Blenorrhagic Processes, Especially in the Vagina of Children, Caused by the Diphtheria Bacillus.** E. KOBRAK, Berlin. *Medizinische Klinik*, March 8, 1914.

The author describes several cases of inflammation of the throat in which only a severe catarrhal condition, without the presence of membrane, was observed, in which, however, culture showed diphtheria bacilli. These cases responded to antitoxin treatment. He then reports two cases of marked vaginal discharge in little girls in which examination of smears failed to show gonococci, but in which cultures showed profuse growth of diphtheria bacilli. Owing to the fact that these cases also quickly responded to treatment by antitoxin, the author believes that this type of vaginal infection in children should be looked for more often.

**The Abderhalden Ferment Reaction in Carcinoma.** (*Ueber die Abderhaldensche Fermentreaktion bei Karzinom.*) G. M. FASIANI, Turin. *Wiener Klinische Wochenschrift*, March 12, 1914.

Fasiani tested 64 serums. The reaction was positive in 95 per cent of the cancer patients and in 65 per cent of cancer-free patients. In four cases of sarcoma the reaction was negative. In view of these findings, the author concludes that the reaction is of little value.

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## FURTHER EXPERIENCES WITH THE IN- VERSION METHOD FOR THE TREAT- MENT OF GIANT VENTRAL HERNIA.\*

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Since writing my paper a year ago upon "The Treatment of Large Ventral Hernia by Inversion of the Hernial Sac: With or Without Opening Into the Peritoneal Cavity" (*New York State Journal of Medicine*, December, 1913), I have operated upon seven additional cases in which I followed the plan described in that paper.

Four of these cases were types of giant hernia, while the three remaining ones were simply large.

One of the former cases was complicated by acute intestinal obstruction; another was one with chronic obstruction to which semi-acute symptoms had been added. Both were in women weighing over 200 pounds, with very large hernia. The former case healed per primam with a perfect result; and the second one, although complicated with intestinal rupture, fecal fistula, extensive sloughing of the fascia, and fat abdominal wall, also recovered with a solid scar. This case is very valuable in that it shows that a cure may be obtained in extreme circumstances by this method.

With the experience of fourteen cases I can urge still more emphatically the use of this method for the cure of a condition that is one of the most trying that surgeons have to meet.

There were no fatalities. Primary union resulted in all but the case referred to above and one in my first series who had a superficial suppuration caused by scratching beneath the dressings. All are cured.

There has been no intestinal paralysis or obstruction due to increased intra-abdominal pressure or intestinal kinks. I can confirm my first statement, that the added tension within the abdomen seems to aid in promoting an early action of the bowels and has not produced respiratory or cardiac embarrassment.

The possibility of puncturing the intestine when the sutures are inserted without opening the sac is granted. Such contraindication for incision into the sac will arise only rarely. Either with a free opening, as is usual, or by one or several incisions only large enough to admit a finger into the peritoneal cavity, the mattress sutures may be safely inserted without danger to the intestine.

As stated above, I have shown that with a proper technic this method will withstand the test of an extensively suppurating wound. However, suppuration is to be prevented by every surgical precaution.

## THE INVERSION METHOD FOR TREATING GIANT HERNIA.

I shall not reproduce here any argument for favoring this method over many of the others now in vogue, but shall merely briefly review the various steps, as published in my first paper.

Large elliptical incisions expose the sac, which, with the external fascia of the abdomen, is cleaned for more than two inches beyond the hernial orifice.

If the sac is to be left practically intact, the elliptical portion of skin must be dissected cleanly away. Usually, however, the portion of sac corresponding to the elliptical mass of skin is removed with the latter, thereby freely opening into the peritoneal cavity. Any complications found are dealt with in the usual manner.

In my experience, the intestine can be freed and any raw spot covered with omentum. Extensively adherent omentum need not be freed from the sac unless it seems to be exercising a deleterious traction on the intestine and stomach. The excess of omentum, usually very thick and adherent, may be trimmed off at a suitable point and the peritoneal cavity closed by uniting the edges of the sac, with this adherent omentum between, by an overcasting suture of No. 2 plain gut. Interlocking the stitch is sufficient to arrest oozing from the omentum.

Before the sac has been closed the first row of the inverting sutures of heavy kangaroo tendon is inserted. These are placed at the edge of the hernial orifice; they bite deeply into this edge for a width of three-fourths of an inch and are half an inch apart. Then the sac is closed, as detailed above, and this first row of mattress sutures tied—

\*Read before the Harlem Medical Association, March 4, 1914.



first above and then below until all have been tied. I use three knots in all these sutures. By this first series of sutures the bulging mass of sac (and also the omentum, if present) is inverted into the abdominal cavity. A second row of the same suture material is placed one inch outside the first row so as to "break joints."

Retention sutures are next inserted. These are introduced through the skin from two to four inches from the margin of the incision. They are placed not more than two inches apart and in a figure-of-eight manner, taking a deep bite into the fascia. When tightened they invert the last row of kangaroo sutures and take all the initial strain. They should be selected with regard to the particular case. The very largest hernia require either double strands of bronze wire, gauge No. 30, or

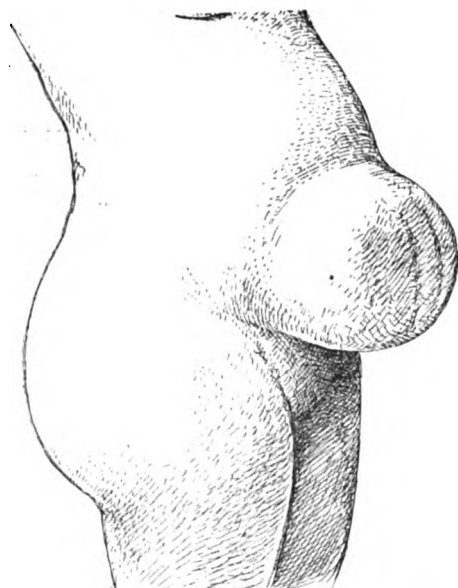


Fig. 1. Diagram of Case VII, showing the type of hernia under consideration.

single strands of a medium-sized twisted wire cable. In the smaller herniae double strands of silkworm-gut or Pagenstecher's linen may be used. All these sutures are doubled for a purpose. If one breaks the other is strong enough to hold; and, doubled, they do not cut so fast through the tissues. I used chromic gut in case XII. The result was perfect, but the gut absorbed at the end of ten days and I was anxious for the next week. These sutures are tied over rolls of gauze half an inch thick so as to afford a broad surface for traction and not necrose the skin from the pressure.

A drain of rubber tissue is laid over the retention sutures and the skin is closed by plain gut, Pagenstecher thread, or silkworm gut. The material is unimportant.

The drain should not be disturbed for three days.

It is then withdrawn for an inch, and this is repeated every other day until it is entirely removed. These cases ooze a great deal of serum. Do not irrigate the drain tract, nor remove the drain to insert another. Infection is possible. Leave the drain as long as there is a free exudate of serum, and remove it gradually as this ceases. Keep the retention sutures tight. I usually tighten them up at the end of five or seven days, and remove them from the 10th to the 14th day after the operation.

Following the operation, a pint of normal saline solution is given per rectum every four hours day and night for 24 or 36 hours. Morphine, from  $\frac{1}{8}$  to  $\frac{1}{4}$  grain with eserine salicylate  $\frac{1}{60}$  to  $\frac{1}{40}$  grain, is given if necessary once or twice during the first 24 hours.

These patients have no more pain than the average patient after laparotomy. The urine is drawn every six to ten hours as necessary. The patients are turned every hour from side to back and to side, if not asleep. This plan I follow out in all my abdominal cases to facilitate intestinal peristalsis.

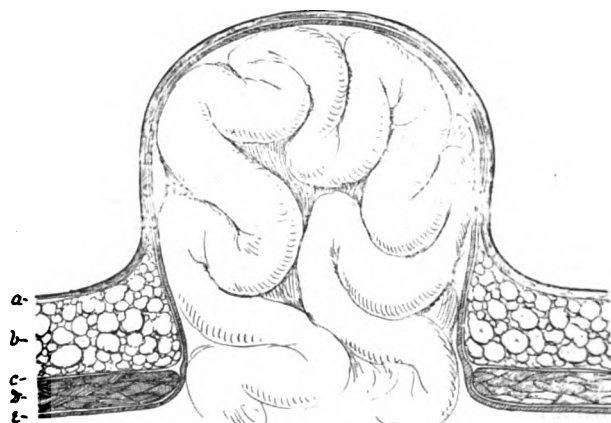


Fig. 2. A sectional view of such a hernia. The contents may be disregarded; the construction of the sac is the important feature. The different structures are lettered the same throughout: a. Skin. b. Subcutaneous tissue. c. External fascia covering the abdominal muscles. d. Muscular layer. e. Internal muscular fascia and peritoneum.

sis. These patients should be kept in bed about a week longer than the usual abdominal section. Their entire stay in the hospital is usually three weeks. Some I have allowed to go home in two weeks under favorable circumstances.

An abdominal belt is used in the majority of cases. I do not feel that it is a necessary part of the treatment, but it gives the patients comfort until the muscles resume their normal function.

CASE VIII:—Mrs. M., aged 55, patient of Dr. Boynton, with whom I operated to demonstrate the inversion method for hernia. Admitted to the Red Cross Hospital, April 22, 1913; discharged, cured, June 29, 1913. The patient is an extremely stout woman, with an immense abdomen. Thirteen years ago she was operated upon for an umbilical hernia.

For the past five years she has had trouble at the site of the hernia. She cannot walk about much because of her weight and the pain of the hernia.

Examination shows an umbilical hernia as large as a child's head just at the left of the umbilicus. It is irreducible. It seems to contain intestines and omentum.

By two long elliptical incisions the large hernial sac was exposed. It was found that there was a large hernial opening two inches in diameter with two or three smaller hernial protrusions through a weak scar below, so that the entire area, over six inches long and two inches wide, had to be inverted. The sac was opened to free the adherent intestines and omentum. In this step a loop of intestines was torn through and the rent was closed with Pagenstecher thread. In spite of the care used this accident infected the wound. This case is interesting as it proved that a cure was possible even in spite of such infection, as will be detailed presently.

The mass of intestines, transverse colon, and small intestines, with the stump of the omentum, were returned to the abdomen.

My method of suturing was carried out with this modification, that silver wire cable was used for the heavy retention sutures; and to this suture material a favorable result was probably due in spite of the suppuration. The skin was closed in the usual manner.

From the infection noted above a fecal fistula followed and discharged for several weeks with

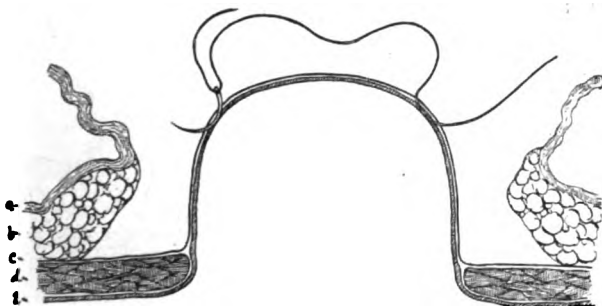


Fig. 3. The illustrations from No. 3 to 8 inclusive depict the steps in the operative treatment when the sac is not opened. This shows the skin dissected from the thin sac and the skin and subcutaneous tissue dissected back from the hernial orifice so as to leave a wide margin of the adjacent fascia cleanly exposed. The first suture, to take up the slack or fullness in the sac, is shown.

sloughing of the external fascia and adipose tissue. However, the wound finally healed solidly and the patient is today perfectly cured of her hernia.

The highest temperature was on the third day after the operation when it reached 102.6°. The bowels moved freely from the day of the operation.

The operation was performed on the 7th of May. She was out of bed on the 26th of June, and discharged cured on the 29th. To secure a cure in this patient in the absence of suppuration would have been a notable result, but to have a perfectly solid wound after a colon bacillus infection certainly demonstrates what a severe test the method can survive.

February 12, 1914.—Dr. Boynton reports that he has seen and examined the patient. She is doing her own work and feels perfectly well. The scar is solid everywhere with the exception of a lit-

tle give in its upper part, where it seems thinner, but there is no hernia.

March 4, 1914.—This patient reported for observation before the Harlem Medical Association. She weighs 207 pounds. A careful examination of her abdomen shows a scar about eight inches long, consisting of firm abdominal wall minus the usual adipose layer. The absence of fat gives the appearance of a thinner wall, but the region is perfectly firm and there is no give in any part. The patient says she is perfectly well.

CASE IX:—Mr. J., about 30. Admitted to the Red Cross Hospital, May 11, 1913. Discharged June 1st. Patient of Dr. Marx, to whom I am indebted for the privilege of reporting the case. Some years previously he was operated upon for suppurative appendicitis. This was followed by a large spherical ventral hernia, situated along an oblique scar, the middle of which is about one inch to the right of the umbilicus.

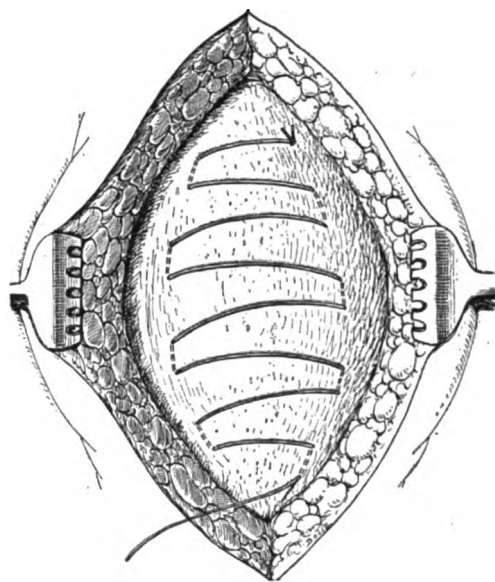


Fig. 4. A view of the outside of the hernial sac with the first inverting suture in position.

The hernial orifice is irregular, but measures about five inches by four.

Operation by Mr. Marx, assisted by me. Elliptical incisions, about seven inches in length, removed a mass of skin and old scar. The sac was purposely opened for the introduction of the mattress kangaroo tendon sutures. There were no adhesions to the interior of the sac. The sac was inverted by a continuous suture of plain gut and two rows of kangaroo sutures, as above detailed. Chromic gut No. 2 double sutures were used for some of the fascial sutures and four double sutures of silk worm gut for retention purposes. The skin was closed by Pagenstecher thread over a small rubber tissue wick.

The course of the case was uneventful and the patient left the hospital on June 1st with a firm wound.

March 2, 1914.—Operated upon by Dr. Marx, assisted by me, for an indirect inguinal hernia on

the right side, which has developed since the operation detailed above for the post-operative hernia. (Dr. Marx had operated some few years ago for an indirect inguinal hernia on the left side. The result was a perfect cure.)

Through the last opening into the abdominal cavity an opportunity was given to examine the scar resulting from the inversion operation. It was solid and six inches long. The peritoneum was smooth and neither intestine nor omentum was adherent. The result was a perfect cure of the ventral hernia.

CASE X:—Mrs. R. W., 42. Admitted to Red Cross Hospital, May 20, 1913. Discharged, June 12, 1913. Large, stout woman. Has had five children.

Nearly two years ago was operated upon for lacerated perineum with complete prolapse of uterus.

Three months later noticed a small lump at right side of scar. This has grown steadily and rapidly

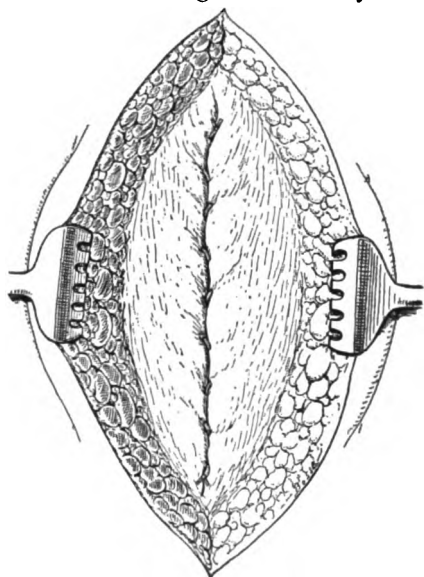


Fig. 5. Represents the appearance after the first suture has been drawn tight.

until now it is a mass as large as a child's head and projects through an orifice six by three inches. Has no pain and bowels are regular.

Perineum firm, uterus normal in size.

Operation, May 21, 1913. Gas and ether. Dr. Fletcher. Assistant, Dr. Boynton.

Elliptical incisions enclosing the hernial sac, eight or nine inches long. Sac exposed and fascia of abdominal muscles carefully cleaned for two inches distally from the hernial orifice.

Sac opened to admit one finger and kangaroo tendon mattress sutures easily inserted, taking up a bite three-fourths of an inch wide and deeply into the margin of the orifice. These were placed half an inch from each other. There were no adhesions of omentum or gut to the sac. The small opening in the sac was closed, the sac inverted by tying the mattress sutures and a second row of kangaroo tendon sutures placed to invert the first row.

Three double silk-worm-gut retention sutures

placed in a figure-of-eight manner and coming out through the skin four inches from the margin of the incisions.

Rubber tissue drain, deep skin suture of plain gut and superficial of Pagenstecher thread. The operation was finished by tying the double silk-worm gut retention sutures over rolls of gauze.

Bowels moved on the third day after the operation and daily or every other day thereafter.

The patient was out of bed on the 21st day and left the hospital the following day.

Examination, June 19th, showed a perfect result.

Patient seen in December and stated she was "perfectly well."

CASE XI:—Mrs. J. B. C., patient of Dr. Arthur, Plattsburgh, N. Y., June 25, 1913. Strangulated umbilical hernia. Aged 65. Large, strong woman, weight 230, mother of eleven living children and seven dead, youngest 20 or 22.

She had an umbilical hernia for 20 years; during the past five years it has been irreducible and gradually growing larger. She has worn a large plate truss over the hernia for the past five years.

The bowels have always been obstinately constipated. They never move without a strong cathartic and with a great deal of pain. Has never been free from pain or distress in the hernia. She has had several attacks of strangulation before when she had to go to bed for from one to two weeks, with pain, vomiting, distention, fever and chills. Has always been able to get the bowels to move after

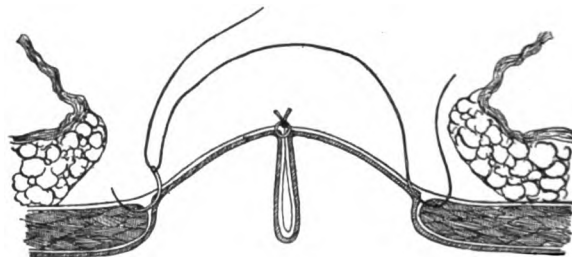


Fig. 6. A cross section to show the infolding produced by the first suture and the placement of suture No. 2. While the needle is represented as being inserted at right angles to the hernial margin in reality it is introduced parallel with the margin of the hernial opening and bites deeply into this margin.

hard work with enemas and cathartics. About two years ago had a very severe attack and operation was urged but refused.

This present attack began the 21st in the usual way, after eating a hearty meal. It was more severe than usual. She has vomited excessively and fecal matter on the last day. For the past 24 hours has been regurgitating thin, watery, black fecal smelling fluid, a mouth full or more at a time every little while. Bowels have not moved nor has she passed gas since the attack began. The pain in the abdomen and especially in the hernia has been severe. Temperature not greatly influenced. The pulse is about 90.

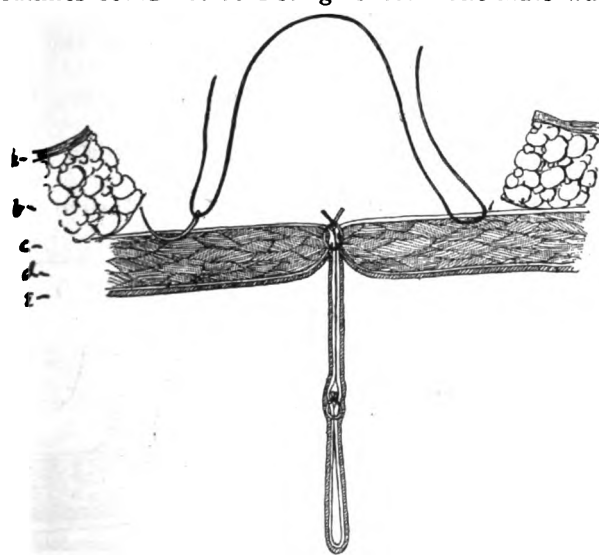
Examination: Large, stout woman, skin very dusky and muddy, tongue dry and coated in middle, edges moist. Fecal odor about mouth. Hernia, umbilical, sac irregular, lumpy, about six inches in diameter; tense, tympanitic in spots and hard

in others. Very tender to the touch. In places where skin is thin it is dark, dusky, and inflamed.

**Diagnosis:** Strangulated, umbilical hernia, contents intestine and omentum. Operation urged. Refused, but finally accepted. Operation, Dr. Silver; assistant, Dr. Arthur; ether.

The writer's "inversion" method was carried out.

Two elliptical incisions removed a mass of skin, fat, and sac about eight inches vertically and six inches transversely. The sac contained a large mass of thick, adherent omentum. It was removed up to the margin of the hernial opening, which was three inches in diameter, and was firmly closed by coils of small intestine and omentum. Some recent ones were reduced, but there was a mass of small intestines about two inches wide at the hernial ring that widened out fan shape to about six inches at the distal border, which was about five inches from the ring. This mass was composed of coils of small intestines entirely adherent to each other so firmly that their individual outlines could not be distinguished. The mass was



**Fig. 7.** Suture No. 2 has been tied and the muscle edges of the hernial orifice brought together. Suture No. 3 is shown in place, about an inch and a half in thickness. To separate the several coils of intestine was impossible, neither was it desirable, for there would be so much raw surface left that it could not be covered in. Resection and anastomosis was undesirable for the added risk of infection and prolonged operation. Therefore, I acted on the plan that these coils had been so many years in such close relation that they were accustomed to act in that relationship and would act again if the conditions were favorable. The hernial ring was split, this *fan-shaped mass* was *reduced en masse* and placed in position behind the orifice. Above it was the stump of the omentum, about four inches across and about half to an inch thick. The peritoneum was closed with No. 2 plain gut. Two rows of mattress sutures of kangaroo were placed to invert the wall and then four retention sutures of double Pagenstecher, tied over rolls of gauze to take the strain off the other sutures.

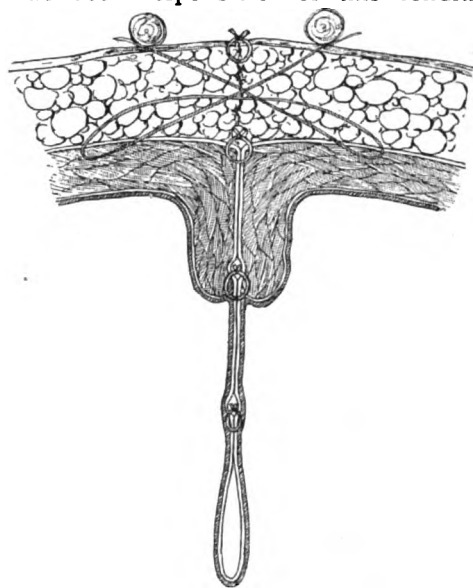
A rubber tissue drain was placed in the wound

and the skin closed with plain gut. The wound healed per primam. The drain was out in a week. The retention sutures in two weeks. The patient was out of bed in three weeks and outdoors in a month. The bowels acted from the second day, without pain the first time in 20 years the patient said.

The patient seen in August. Scar smooth, eight or nine inches long. Abdomen firm, smooth, and painless. A perfect result. Patient gaining in weight and strength. Doing work about the house. Bowels act daily without cathartics.

Attention is called here to the deliberate reduction *en masse* of a large matted bulk of small intestines and the perfect functional result that was obtained in the intestines in spite of such an unfavorable condition.

I would not advocate the reduction of such masses of adherent intestines except in unusual circumstances. The pressure of the truss for many years had been responsible for this condition as



**Fig. 8.** Suture No. 3 has been tied and the surfaces of the fascia over a wide area have been brought in firm contact. This last suture rolls inward the edges of the muscles forming the hernial orifice. A figure-of-eight retention suture is shown in position, to be tied over rolls of gauze; and the skin edges coapted by a last stitch.

well as the inflammation following repeated attacks of strangulation and obstruction in the hernia. My reasoning was that these loops of intestine had been in this position and had functionated, with difficulty, for many years, and that there was a compensatory arrangement on the patient's part to overcome this condition and that if the immediate obstruction was removed we could expect that the function of the intestine might be restored to at least its previous condition. A resection was not advisable, for I felt that to add this to the excess of trauma already experienced by the patient during the preceding few days would be more than she could stand. I had rather have a living patient with some difficulty in intestinal function than a dead one with a "perfect resection and anastomosis." The result was such a great surprise in the perfect restoration of bowel function without arti-

ficial means that I deem it justifiable to make this extended note upon the case.

CASE XII:—Mr. A. O'T., aged 38 years. Harlem Hospital, admitted September 13, 1913. Discharged October 9, 1913.

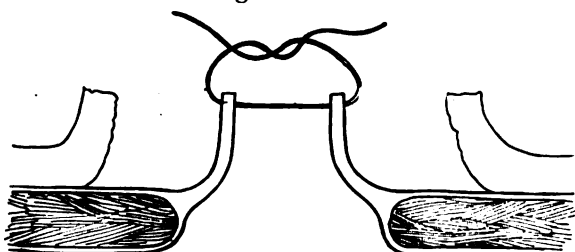
Two and a half years ago was operated upon for a ruptured appendix with abscess. Wound had to be drained for a long time and healing was slow. Patient was under treatment for two months.

Present trouble began three months ago when he noticed a swelling in the scar. This has been rapidly growing larger, but gives no trouble except from its size.

Examination shows a large protruding abdomen with weak abdominal walls. There is a long oblique scar across the abdomen at the right of the umbilicus. This scar is over a large, irregular, ventral hernia which has numerous extensions. Most of the hernia is reducible and there are two or three orifices felt leading into the abdominal cavity.

Operation, September 20, 1913. Two incisions about eight inches long enclosing an elliptical mass of skin and sac were made and the enclosed mass excised. This disclosed a hernia through a gap five inches long and two inches wide, with the omentum and intestines adherent in several places to the sac. The omentum was excised, the intestines dissected free, and the raw surface covered with omental flaps. The edges of the sac with the excised omentum in between were sutured together with interlocking sutures of No. 2 plain gut doubled.

Two rows of kangaroo tendon mattress sutures



(The figures 9 to 12 inclusive show the adaptation of the method to the case where the sac has been opened.)

Fig. 9. The introduction of the first suture.

rolled in the margins of the hernia and the adjoining edges of the abdominal wall for more than an inch. Four retention sutures of double strands of silkworm gut placed in a figure-of-eight manner were inserted at a wide distance from the skin incision and still further inverted the fascial margins. The skin was closed by plain gut over a rubber tissue drain.

The drain was removed entirely, at several stages, by the 29th. Primary union. The retention sutures were removed on the 13th day after the operation. Patient was out of bed on the 16th and discharged cured with a solid scar on the 19th day after the operation.

The highest temperature was 100.8° on the fourth day after the operation. The bowels moved every day, including the day of operation, until the patient left the hospital.

February 28, 1914.—Seen by myself. Scar is eight inches long, perfectly firm. Man works every day as a flagman and switchman. Feels perfectly

well. Bowels have acted normally every day. Says he feels fine.

CASE XIII:—Mr. J., 50 years of age. Red Cross Hospital. Admitted October 14. Discharged October 29, 1913.

Was operated upon 15 years ago for an attack of appendicitis.

About two years after the operation patient suddenly felt something give away in the region of the wound and since that time has been suffering more or less with stabbing pain more or less severe.

Examination shows a post-operative ventral hernia of moderate size, four inches in length by two inches wide.

Through two six-inch incisions the steps of the inversion method were carried out. The sac was opened and the intestines were found non-adherent to it.

Suturing done as described in other cases.

Bowels moved on the fourth day and daily thereafter.

The retention sutures were removed on the eleventh day after the operation; he was out of bed on the 13th day and left the hospital on the 15th day.

February 16th, 1914.—Scar seven inches long, perfectly solid.

Bowels are regular and normal. Works every day and feels "perfectly well."

CASE XIV:—Mrs. A., aged 36. Harlem Hospital, December 13, 1913. Housework.

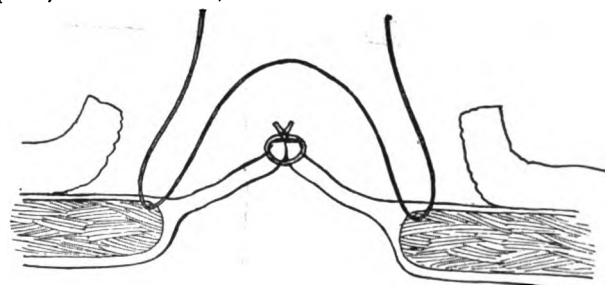


Fig. 10. The closure of the hernial sac and the introduction of suture No. 2.

Has had two children, full term, normal delivery.

In 1902 was operated upon at one of the city hospital for "internal trouble," and six years later was again operated upon for some abdominal trouble.

Appetite poor, bowels constipated. Frequent nocturnal urination. Habits good.

During the past three years has marked a swelling in the left lower part of the abdomen, which has steadily increased in size. This pains her occasionally, but she has never had attacks of vomiting. Examination is negative except for a large ventral hernia at the site of an abdominal scar between the umbilicus and symphysis. This is about the size of two fists and at the left of the midline.

Diagnosis: Ventral hernia, post-operative, of the dissecting variety. It is easily reducible and there is an orifice one and one-half by two inches.

Operation, December 16th. On exposing the hernial sac by two elliptical incisions six inches long a typical dissecting ventral hernia with several chambers was found. The sac was opened in one

or two places and was found free from adhesions to the viscera. As the entire scar line was weak above and below the hernial orifice it was inverted with the hernial sac by two superimposed lines of kangaroo mattress sutures, the line of infolding being about six inches long. Silkworm gut, double, retention sutures in a figure-of-eight manner, four in number, were placed and tied over pledgets of gauze. A rubber tissue superficial drainage wick was placed in the wound and the skin closed with No. 1 plain gut.

Convalescence was smooth. Patient left the hospital at the end of four weeks.

January 31, 1914.—Reported for observation. Result perfect at this date. Bowels acting normally.

February 17.—Scar six inches long, solid. Bowels regular.

SUMMARY: Size of openings. (Cases I to VII inclusive are from my first series.)

CASE I:—Eight by four inches with an anterior protrusion of four or five inches beyond the level of the abdominal wall. Result, cured.

CASE II:—"Large post-operative hernia through a scar for gallstone operation." Cured.

CASE III:—Umbilical hernia of moderate size with two linea alba defects above it requiring the

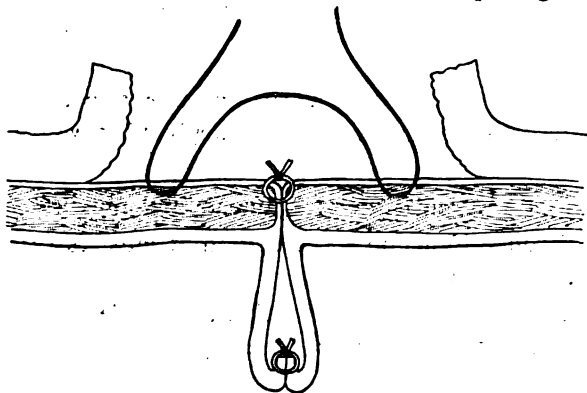


Fig. 11. Suture No. 2 has been tied with the result of coaptating the edges of the hernial orifice, and suture No. 3 is inserted.

inversion of about six inches of abdominal wall. Result, cured.

CASE IV:—Umbilical hernia of moderate size. Cured.

CASE V:—A post-operative hernia as large as a grapefruit through an opening in the abdominal wall six by two inches. Cured.

CASE VI:—Small post-operative hernia. Cured.

CASE VII:—Immense hernia as large as the crown of a derby hat. A fibroid tumor was removed from this sac which measured six and one-half by four and one-half inches. The gap in the abdominal wall measured seven by four inches. Result, cured.

CASE VIII:—Umbilical hernia as large as a child's head through one opening two inches in diameter with two or three other smaller orifices adjacent to it. An area over six by two inches had to be inverted. Intestinal rupture, fecal fistula. Cured.

CASE IX:—Post-operative hernia through a gap five by four inches. Cured.

CASE X:—Immense post-operative hernia through a gap six by three inches. Cured.

CASE XI:—Very large umbilical hernia through an orifice about three inches in diameter. This had to be enlarged four inches to reduce a great mass of small intestines. Result, cured.

CASE XII:—Post-operative hernia through a gap five by two inches. Cured.

CASE XIII:—Post-operative hernia through an opening four by two inches. Cured.

CASE XIV:—Post-operative hernia through several places in a weak scar about five inches long. The entire extent of the old scar had to be inverted, an area of about six by two inches. Cured.

Fourteen cases, all cured.

Six cases may properly be termed giant hernia. The others were either large or ordinary and operated by this method to demonstrate its applicability to any form of ventral hernia, post-operative or umbilical.

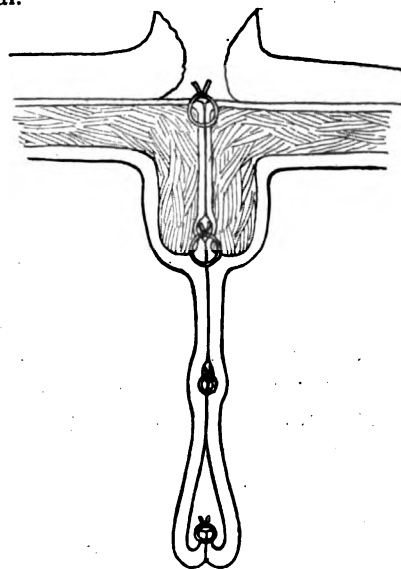


Fig. 12. Completion of the closure of the hernial opening. The skin (and fat) are to be sutured as depicted in Fig. 8.

Primary union in twelve cases. Superficial suppuration in one case, skin only. Fecal fistula, fascial necrosis, and protracted convalescence in another. Hernia cured in both.

No post-operative complication in any case from increase of intra-abdominal tension. Bowels acted spontaneously or easily from assistance on the second to fourth day. And regularly thereafter. No intestinal damage from insertion of sutures.

With these results I can confidently recommend the inversion method for treating these giant and also smaller ventral hernia.

107 W. 85TH ST

#### URETHROSCOPY.

The urethroscope is occasionally of service in entering excentrically placed openings in cases where the caliber of the urethra anterior to the stricture will permit of its use. The injection of the suprarenal preparations has at times acted nicely by their constricting effect on the bloodvessels, making it possible to get a small instrument through where nothing could be made to pass before.—R. W. STALEY in *The Lancet-Clinic* by Google



## MASSAGE AND MOVEMENTS FOR CERTAIN AFFECTIONS OF MUSCLES AND LIGAMENTS.\*

W. P. HERRICK, M.A., M.D.,  
Surgeon, Demilt Dispensary,  
NEW YORK.

In urging a broader field for massage and movements, I would emphasize that they are not a cure-all, but are valuable aids for certain conditions. Their earlier neglect gave a sound plank to the rotten ships of charlatanism and cults, from bone-setters to their modern representatives. In abandoning certain patients to that chance fate, are we not leaving undone some of those things we ought ourselves to have done?

On a visit to the clinics and hospitals of New York City where massage and passive movements are used, it was pleasing to see so much good work being done, with the rapid growth of the applications of physical therapy in the last few years, even months, or weeks. Especially was this true of some orthopedic and neurological institutions. It is, however, surprising that priority so limits massage to the treatment of fractures in our surgical clinics, in spite of the fact that massage, "a kneading," is essentially adapted to muscular structures and accessible ligaments, which offer a great field—as do also some disturbances of the digestive tract, peripheral nerves, etc., not germane to this paper.

Massage is mainly manual and should naturally interest surgeons, who work with their hands; even a little practice giving increased delicacy and firmness of touch and the ability to detect indurations or atrophies of muscles, tender points of spinal exit or peripheral distribution of nerves.

Massage is rarely taught in our colleges, which results in indifferent knowledge and interest, restricts the physiological application, tends to make it a last, rather than an early, resort, and delays the standardization of masseurs. Some of us may not have even read one good book on the subject, as that of Graham, Dowse, Kleen, or Despard.

It is well known that muscle and ligament affections are often precursors of deformity, notably the deformities of flat-foot, lateral curvature, post-infantile paralysis, etc. Pre-deformity is a natural branch of prophylactic surgery, whose growth should emulate prophylactic medicine. When thousands of surgeons, instead of comparatively few orthopedists and neurologists, efficiently treat muscle and ligament affections, intractable deformities will be much rarer.

The importance of massage and movement for

impaired nutrition or function of muscles and ligaments is the basis of this paper. In health, function and nutrition go hand in hand. Injury or disease, in interfering with one, impairs the other. The muscles have been termed the peripheral heart. In contraction, the serum is squeezed from the lymph spaces to the lymph channels, from the capillaries to the venules and veins. Most lymph vessels and veins having valves, their contents when centripetally advanced, cannot return. On relaxation, fresh blood and serum are supplied, and nutriment is given, excrement having been removed. The ligaments in functioning, aided by adjacent tendons, act similarly, but passively.

Each massaging hand, about the size of the heart, has been compared to a peripheral heart, and stimulates muscular contraction. Passive motion more affecting ligaments and tendons parallels their function. Active and free motions combine the benefits of both.

Thus briefly do massages and movements aid impaired nutrition and function, hasten repair, and break the vicious cycle of injury, or disease.

One warning: massage is contra-indicated in acute infection.

In this short article I can only mention certain conditions and cases, but let us apply what we have to:

First: Traumatism of ligaments and muscles.

Second: Function and nutrition of muscles (general and local).

Third: Disturbed innervation of muscles.

Under traumatisms considering:

- (a) Contusions.
- (b) Ruptured muscle fibers.
- (c) Myositis; and,
- (d) Sprains.

(a) *Contusions*.—On receiving a blow the first natural impulse is to rub the part. Nature is right. Continued gentle centrifugal stroking obtunds sensation, and tends to remove the effused serum or blood, to prevent congestion and swelling, interfering with the return circulation; while with diminished or abolished tenderness, kneading gives nutriment for repair of the damaged tissues. As we all know, the tender point of a contused ligament is often persistently annoying; massage for this will bring prompt relief. So it will for contused muscles, with or without ruptured fibers. Here, tenderness may be exquisite, making it necessary to proceed very slowly and gently, with repeated treatments, but the results are most pleasing, as the following recent cases illustrate:

Mrs. T. E., four weeks previous to coming to the

\*Read before the Surgical Section, N. Y. Academy of Medicine, March 6, 1914.

clinic, fell on the floor, injuring her right buttock. There was considerable discoloration, which disappeared later; she was unable to walk properly and could not lie on the injured side. Induration, six inches in diameter, of the right gluteus maximus with a very tender point near its center, was found. A diagnosis was made of contusion of the right buttock with rupture of muscle fibers of the gluteus maximus, and local massage and vibration were given in four treatments, December 19 to 31, 1913, when all symptoms had disappeared, function was perfect, and she was discharged cured.

Mrs. E. D., two weeks previous to coming to the clinic, fell down a flight of stone stairs, bruising her left buttock, injuring muscles of the left lumbar region, and was momentarily unconscious. Since then the muscles have been exquisitely tender and painful. There was a tender, indurated area, two inches by four inches, with a point of exquisite tenderness near its center, involving the latissimus dorsi and a similar area about the size of one's hand in the left gluteus maximus. A diagnosis of contusion and ruptured fibers of these muscles was made and massage and vibration given in four treatments, December 26 to 31, 1913, inclusive, when all tenderness and induration had disappeared. She, however, returned January 12, complaining of pain over the lesser sciatic nerve, where points of tenderness were found. Late pregnancy has since prevented further treatment for the injury to the nerve, but the case illustrates the effective *cure in four treatments* of contusions and ruptured fibers of the muscles.

(b) *Simple rupture of muscle fibers* is often followed by painful muscle spasm, immediately, or on attempted function. Massage is generally most effective in muscle spasm, besides its curative action, in this condition, which may be shown by the case of

G. M. The day before coming to the clinic, when pulling heavily on a large wrench, felt a sharp pain in the back of the right shoulder, which almost completely disabled it. He complained of pain on moving the head and right shoulder. Tenderness and induration of the humeral fibers of the right trapezius were found, and a diagnosis of ruptured muscle fibers made. Local massage and vibration were given December 1 and 3, when the symptoms had disappeared, function seemed perfect, and he returned to work cured.

(c) *Myositis*, often termed muscular rheumatism, closely resembles the above. It frequently follows a forgotten strain or injury, is oftenest located in the lumbar, deltoid, or trapezius muscles, those most liable to strain, generally has tenderness with loss of power, commonly severe pain on attempted function, and often indurated areas. It also responds well to massage, as may be illustrated by the following deltoid and trapezius cases:

W. G. had previously sustained a fracture of the clavicle, completely united. For several months previous to coming to the clinic he had suffered se-

vere pain in the left shoulder, recently so severe that he would have to walk the floor every night. There were tenderness of the deltoid, and almost complete inability to raise the arm, as he was obliged to use the other in endeavoring to do so. A diagnosis of myositis of the deltoid was made and the old fracture of the clavicle was noted. Local massage and vibration were given on that date, with practically complete relief. He returned two days later to report himself well, when he received another treatment, was discharged cured, and has remained so since.

J. B., who for months before coming to the clinic had had tenderness of the right posterior portion of the neck, and pain on moving the head, without history of injury, showed induration and points of tenderness in the humeral portion of the trapezius. Diagnosis, myositis of the trapezius. Local massage and vibration were given that day with so much relief that the patient returned to work, discharging himself cured.

Though some cases take longer than these, the results are usually satisfactory.

(d) *Sprains*.—Here ruptured ligamentous fibers, and often effusion of the joint, are added to the conditions of ligament contusion. When any bony attachment of a ligament is torn away, the sprain is best classed and considered with fractures. Effusion in the larger joints, knee, and shoulder is perhaps better considered with affections of joints, and preliminary immobilization may be advisable. In the smaller joints, however (ankle, elbow, wrist, phalanges, etc.), effusion in sprain reacts wonderfully to immediate massage, as I can testify to both as patient and as surgeon.

Last spring I was thrown forward by tripping on going upstairs, the weight being received on the right hand and wrist, which soon became very painful and practically useless. Three hours later there were swelling, effusion in the joint, and exquisite tenderness over the external lateral ligament. One massage treatment largely relieved pain and allowed considerable use of the hand. Three massages in 48 hours cured the injury. Ill-luck later occurred on the first afternoon's tennis game. In stopping suddenly the toe caught, the foot turned under, and a severe sprain of the right external lateral ligament and tarsus was sustained. Next morning the ankle and foot were swollen, ecchymotic, extremely tender and painful, scarcely to be moved, and unequal to bearing any weight, with exquisite tenderness over the external lateral ligament and tarsus, and effusion of the joint. Massage and passive movements were given four times within three days, when all symptoms had disappeared. Strapping was then applied, however, to afford good union to the fibers and prevent repetition of the injury.

E. S., on November 26, 1913, about 1 p. m., slipped on the stairs and injured her right ankle. She was unable to bear her weight upon the foot and was brought to the clinic in a carriage at 2 p. m., and on leaving was almost carried by two

friends. The right ankle was found to be very tender and much swollen. There were effusion in the joint and points of exquisite tenderness over the external lateral ligament, with sickening pain, when it was put on the stretch. The patient was hardly able to put the foot to the floor and unable to bear her weight upon it. Diagnosis, sprained ankle, especially of the external lateral ligament. Massage, followed by passive movements, were given. The patient was sent home to bed, where another treatment was given that night and the next day, when she was told to return to the clinic, which she did the following day, walking without perceptible limp. Massage, passive and active motions were again employed, and as the patient felt perfectly well, the ankle was strapped to afford good union to any ruptured fibers, and protect against subsequent injury. She was told to return in two or three weeks for removal of the straps and final examination. As she was cured, she later removed the straps herself, and it is interesting to note that the intermediate day being a holiday, by this treatment only a part of two days was lost from her work, a real consideration to herself and her employer.

J. L., one week before coming to the clinic, while playing basket ball, stepped on another's foot and wrench his own. A few days later he found difficulty in walking, which steadily increased, so that, as he expressed it, he was almost dragging his foot when he came for treatment. There was a tender spot over the external aspect of the fifth tarsometatarsal joint with pain on putting the ligament on the stretch. Diagnosis, sprained tarsus.

Massage and vibration were applied, and the foot strapped. He was told to report three days later. This he did, though feeling perfectly well, so no treatment was given. Later he removed the straps himself, and despite being on his feet nearly all day every day, he has felt no discomfort since.

E. H., sprained wrist, with effusion in the joints similar to my own, cured in four treatments.

F. P., sprained elbow, similarly cured in two treatments.

These few citations show sprains completely cured in usually about as many days as weeks were required by rest treatment. Strapping, in allowing function, was a great advance, and massage, in aiding both nutrition and function, is its natural complement, and is always an advantage preceding, or with strapping.

The advantage of prompt treatment, as diminishing the time required for cure, is also shown. Slight tarsal sprains often become worse without treatment, paralleling weak-foot.

## II. NUTRITION AND FUNCTIONS OF MUSCLES.

(a) *General effects.*—Zabludowski found in man that after severe exercise a rest of fifteen minutes brought about no essential recovery, while after massage for the same period the exercise was more than doubled, showing prompter recovery from fatigue.

Professor Maggiora of Turin also showed that muscles concerned in a special movement could do twice as much work after a few minutes' massage, as without it, i.e., increased power for sustained exertion. The details are given by Graham. The voluntary muscles should comprise about half the body weight, and receive one-quarter the amount of the blood, so that the profound secret of their well-being on the general system is readily inferred. The medical aspects may not interest us, but Pool has recently shown the benefits of certain systematic exercise in post-operative treatment, and quotes Kleinschmidt, Krecke, and Henle as similarly advocating exercises and massage. It would seem reasonable that they might also be of value in the pre-operative or preparatory treatment of certain cases.

Its effect in impaired development and function of muscles may be shown by the case of

B. D., ungraded school boy of ten, referred by Dr. W. B. Noyes, of the neurological department, with a diagnosis of cerebral and cerebellar diplegia, manifest in impaired brain and muscular function, whose case must be summarized. He was constantly falling down, went upstairs one step at a time, would drop any bundle he attempted to carry, from weakness of hands and arms, and was dropped from school as dull and undisciplined.

He was a thin, rather pale, dull looking boy, small for his age, with high arched palate and very irregular teeth, articulation difficult and indistinct, extremely small, flabby and weak muscles throughout, of weak, uncertain gait, weak hands and arms, some joints of fingers capable of great hyper-extension, lack of muscular development being especially evident. Now (about three months later) his color is fairly good, he looks much brighter, especially in his eyes, has gained flesh, and his muscles have gained in size and consistency. He walks steadily, runs well, goes upstairs normally without even grasping the balustrade, can carry bundles of considerable weight a reasonable distance, as about ten pounds half a mile, and lays them down when tired. He talks much more distinctly and his mental condition seems somewhat better, showing both muscular and general improvement.

(b) *Local effects.*—In health there is a state of muscular equilibrium of opponents; this is maintained, within limits, by extra work, giving extra nutriment and causing muscular development of the weaker. But beyond these limits in impaired nutrition and function, the weak relaxed muscle becomes stretched, with further impairment, in the opponent contracted ligament contracture follows, and even bony deformity. Likewise in poorly nourished, over-stretched ligaments, nutrition is hampered, and diminished function with pain may result. Massage may aid relaxed muscles to regain their tone, especially when over-stretching is pre-

vented; and contracted muscles to a limited degree may be stretched. An anesthetic for breaking down adhesions, or tenotomy for a contracted muscle, may be preferable, however, to massage and movements alone, but either is aided by subsequent manual treatment. Similarly relaxed ligaments, through increased nourishment, especially with adjacent tendons aiding through development of their muscles, may regain normal function, and contractured ligaments may be elongated; with the apparent anomaly of both relaxed and contractured ligaments and muscles being benefited by like treatment. The common conditions of weak-foot and flat-foot well illustrate some of these conditions:

A. R., 50, stock exchange floor member. Though formerly a long-distance runner, for some months had had severe pain in the feet, after prolonged standing or walking. Examination showed tenderness of the calcaneo-navicular ligaments; eversion of both feet; good-sized but flabby muscles of the calf; shortening the tendo Achilles; flexion, extension, abduction, and adduction diminished, especially of the left foot, though the arches were little if any flattened.

A diagnosis of double weak-foot was made, and massage, vibration, and resistive movements given, in ten treatments from December 6 to January 10, 1914, appropriate exercises having been taught and practiced, when the patient said he had had no discomfort for some time. The calf muscles then felt firm, the feet were practically normal, except a point of very slight tenderness over the left calcaneo-navicular ligament. This was strapped for about five days, since which time, despite standing for many hours a day, there have been no symptoms. He has been told, however, to continue his exercises for six months.

It is probably unnecessary to point out the bearing this has on weakened muscles and ligaments after immobilization, as in Pott's fracture, etc., or the enormous prevalence of weak-feet in school children, with liability to permanence and deformity, which surgical vigilance may forestall.

Mrs. M. B. came to the clinic, having suffered so many years from pain in her left foot and ankle, with difficulty in walking, that she could hardly recollect when she had not had it. Her condition was similar to that of A. R., except that there were great rigidity of the feet, flattened arches, and joint crepitus of the left ankle. Treatment was similar except for two weeks preliminary strapping, which diminished pain and tenderness. Forty treatments during about six months were required. This case illustrates a complicated and severe flat-foot, similarly cured, but requiring many months instead of weeks, on account of the deformity.

Such cases show *cure*, with restored function, not *relief*, dependent on continued use of apparatus, as plates, shoes, strapping, etc., and they must stand as illustrations for similar conditions elsewhere.

Space forbids more than mention of relaxed or contractured ligaments and tendons of the knee or shoulder; the importance of exercises and massage especially in the pre-deformity stage of lateral curvature, etc.

### III. DISTURBED INNERVATION OF MUSCLES.

Obviously, innervation may be disturbed by peripheral, cord, or brain causes; which may be permanent and destroy the muscle, or temporary, with temporary abolition or impairment of function and nervous control of nutrition; thus directly and indirectly affecting both.

Here the affect is extreme. The muscle becomes flabby and smaller, muscle fibers degenerate; some axis cylinders deprived of ganglionic activity also degenerate; contractures, adhesions, etc., may develop; and associated with the involvement of many muscles all the tissues may be affected, with diminished growth and shortening of the limb. Early muscular response may have been fairly good; soon this is slow and feeble to stronger galvanic stimulation of the nerve and faradism; then these are lost, and direct galvanic stimulation with stronger currents is necessary, Anodic closure contraction being greater than cathodic; or reaction of degeneration is complete, when muscular response may be lost, and the muscle cannot respond to a perfect nerve impulse.

Meanwhile, should nerve centers have been involved, the pressure of congestion or effusion has disappeared, the majority of the cells are ready to resume their function; some are damaged, others may be destroyed; but here is an important point, nerve centers are associated, and apparently in a nerve trunk fibers go from one center to several associated muscles and a muscle receives fibers from several associated centers, so, though many cells be destroyed, all nervous control of a muscle may not have been lost, but simply diminished or in abeyance; thus it seems possible, and also from clinical experience, that certain cells may vicariously take up functions of destroyed cells, while many believe muscular function hastens completion of nervous control.

Natural indications, then, are to:

(a) Early combat atrophy with nourishment (to prevent serious muscle damage and allow response to earliest nerve impulses).

(b) Encourage function and improve it by education.

(c) Encourage regenerating axis cylinders.

(d) Avoid interference with function in obviating deformity, though a destroyed muscle may demand tendon transplant. (Lovett's admirable de-

scription in his anterior poliomyelitis articles were seen after writing the above; brevity leads us to let ours remain, giving due credit, and accepting responsibility for differences.)

In practice the rule holds that peripheral lesions, with restored conductivity, are more amenable than central ones, as is evident in birth palsies; but reasonable promptness in hemiplegia may save starving tissues.

Mrs. G. is an instance of function aided by massage after restored peripheral continuity. Briefly, she ruptured the right brachial plexus by falling out of a window December 18, 1912, the arm, forearm, and hand being almost completely paralyzed. She came to me six weeks later, when a diagnosis was made and Dr. Alfred Taylor sutured the nerves at the Neurological Institute; there was some massage given, but the patient became discouraged and gave up treatment. Hearing of this October 15 she was sent for and function found practically the same as before operation, but with massage she now uses all the muscles, cooks and dresses herself, the main weakness being in the deltoid.

In cord lesions, though, there are very pleasing results from newer treatment and the educative exercises of locomotor ataxics, etc., massage and movements are very helpful.

Affects of anterior poliomyelitis on muscles and ligaments better illustrates results of massage and movements, as shown in hundreds of Lovett's cases and those of Fraser of Rockefeller Institute soon to appear, including management of the early stage. However, as one of my cases is of ten years' standing, and an indication of methods in late stages might be of interest, I would summarize them in closing.

In 1903, feeling that the brace, while endeavoring to prevent deformity, so severely interfered with function and nutrition, as to be generally unsatisfactory, I determined to substitute massage and function, endeavoring to foresee and obviate deformity by any other means possible.

This was done in the case of Lena B., age then five, of Waquoit, Mass., who was brought to me September 15, 1903. She had never been ill until two years before, when she had a chill, followed by fever, which lasted some days. Her legs were then found to be paralyzed and tender on pressure, though sensation was diminished, for about seven weeks. A diagnosis of anterior poliomyelitis was made, and she was brought to New York and treated at the Hospital for the Ruptured and Crippled Out-Patient Department with electricity for three or four weeks, with improvement, and a brace was fitted, after which her parents took her to Waquoit. In 1903, she was wearing the brace and I was consulted.

Examination showed three-fourths of an inch

shortening of the left leg, with atrophy of the leg and thigh. Drop-foot was present so that the toe was dragged in walking with some inversion of the foot. Weak-foot was not apparent. The brace was removed, a laced shoe raised three-fourths of an inch was ordered (and this never had to be raised further). Massage twice a day with active motion and exercise ordered, and under this treatment there was steady improvement. The muscles developed up to those of the other limb, though it was a year or two before she was able to run normally. She is now taller and heavier than her mother. She wears a thicker sole on the affected side, but otherwise is entirely normal, running, dancing, ice skating, etc.

Subsequent cases strengthened this belief, and developed methods, so that after the acute stage, we now teach the mother to give the required massage twenty minutes night and morning. It is given at the clinic three times a week, with first passive, later active and resistive movements and special exercises; natural exercise is encouraged as soon as possible.

Where advisable we strap against stretching, of gravity, or too strongly opposing muscles, to help obviate deformity without interfering with function, the guiding principle of this muscle-strapping being, from origin to insertion of the muscle, the resultant line of force being in the line of the muscle's fibers; or the same principle, as in ligament strapping.

Massage may be given through strapping, or the plaster may be dissolved by xylol, etc. In the lower extremity the peronei and tibialis anticus are so often affected, causing weak-foot, that lace shoes adapted to this, and in heavier children a foot plate, may be ordered, with weak ankles a leather anklet, or leather side supports in the upper of the shoe are also ordered and possibly a rubber anklet might aid. With drop-foot in young children, Fraser has suggested an elastic band sewed to the junction of vamp and upper and held above with sufficient tension to raise the foot by a straight garter; in older children we use strapping, and ingenuity may suggest better methods. In shortening of a limb, the proper shoe is raised sufficiently. In the upper extremity and elsewhere the same principles are applied, all cases being carefully examined for lateral curvature which, if present, is treated by appropriate exercises and massage.

When even these indications are met, it is often surprising how well the children will walk and even run, how long after the attack, even years, we find muscles recovering function, encouraging the belief that with increased skill braces will rarely or never be required and tendon transplants less frequently.

Some recent illustrative cases cannot be given in extenso, but must be summarized.

R. W. showed similar improvement to Lena B., to practically complete function, roller skating about the neighborhood, but on stopping treatment with an uncured weak-foot and discarding his plate, he retrograded and resumed a brace, when impairment was rapid. Resumed treatment again shows improvement (rapid retrogression with brace, rapid improvement of functional method).

Arthur D.'s leg was similar to Lena B.'s, and his arm is rapidly improving. (Practically cured leg, almost cured arm.)

Patrick McC. showed marked improvement, with retrogression on abandoning treatment before cure, and so marked improvement on its resumption that we have great hopes for his recovery.

Florence B., referred by Dr. Fraser, was recommended by others to have a brace with its possibilities of harm, but by the above method he has good foot function, walking and running, and despite difficulties, this would lead us to believe in her probable recovery.

Helen O., also referred by Dr. Fraser, despite marked atrophy and disability of the shoulder muscles, showed prompt use of the hand after massage, and her improvement is encouraging.

#### CONCLUSIONS:

1. Increased nutrition and function are essential to the cure of many affections of muscles and ligaments.
2. In obviating deformity interference with function should be avoided.
3. Massage and movements are important aids to these ends, and should be much more generally used by surgeons.

#### "INNOCENT" GALL-STONES.

For years it was taught that gall-stones might exist without producing any symptoms whatever. This old theory was based upon the frequent discovery at autopsy of gall-stones in patients who had no history to point to their presence. The fallacy in this argument was that the patients were dead when the gall-stones were found, and could not be questioned about symptoms that might have existed and that might have been due to gall-bladder disease. In recent years, however, when gall-stones have been found unexpectedly at abdominal operations, later questioning has often elicited a history of chronic dyspepsia which had not seemed to have any relation to the gall-bladder, but which disappeared after the operation. Moynihan, in 1908, was one of the first to call attention to this, and to insist that gall-stones always cause symptoms, even though the latter are purely dyspeptic in character. He gave the name "inaugural" to these symptoms, which in his opinion may persist for years before their real cause is recognized.—WM. F. CHENEY, in the *Interstate Medical Journal*.

#### A PLEA FOR CATGUT AS A SKIN SUTURE.\*

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The evolution and development of a surgical technic results from the combined experiences of many men, changed from time to time as the views and methods of individual operators are tested in the crucible of clinical practice, and adopted, modified, or rejected. All are desirous of attaining what is best and that which contributes to the comfort and safety of the patient.

In no field has there been greater activity than in the care and handling of the skin in its preparation before and its treatment during operation, as well as its closure afterward. The marked trend has been toward simplicity of method. The question of the absorbable vs. the non-absorbable suture has been much and vigorously discussed, and there has been a tendency upon the part of surgeons to eschew catgut.

The object of this short essay is to record my experience in the use of absorbable sutures, in order that it may contribute, however feebly, to draw attention to its many valuable features. No attempt will be made to present an argument based upon scientific bacteriological investigation, but only to draw attention to clinical results.

I have been for many years a consistent believer in the use of catgut sutures, to the exclusion practically of all others, except in intestinal work, and in that time I have tested this method in its various aspects thoroughly. The premise will be accepted by everyone that the ideal wound course is that of one made under aseptic conditions, closed with a suture that will be disposed of by the tissues and allowed to remain under its first dressing until complete healing has taken place. Under such circumstances, if no contamination has taken place at the time of operation, none can occur under the undisturbed dressing; while the converse is equally true that whenever exposure of the wound is made by change of dressing, bacteria may be admitted and infection take place. The withdrawing of a stitch at this time through the deeper tissues may result in deep infection. Such ideal wound healing can be obtained only by the use of catgut.

The objections to the use of an absorbable suture may, in the final analysis, be reduced to two, viz.: First, that the organic material may prove a suitable culture medium for the bacteria buried in the skin, resulting in wound infection and a stitch abscess. Second, that absorption may be too rapid,

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and the edges of the wound be permitted to gape before complete union has taken place. It is my opinion that both of these can be safely eliminated. In a paper presented a number of years ago (*Transactions of the Medical Association of Georgia*) I advanced the claim that catgut became a safe suture just in proportion as skin disinfection stops short of skin traumatism, and the present tendency to simplicity of preparation bears out this claim. A skin that is scrubbed, scraped, washed, and soaked in strong chemicals is not in shape to take care of any kind of suture. Gentle washing of soap and water and alcohol, and when perfectly dry painting with tincture of iodine, seems to be the ideal method, as seen at present. Perhaps a dry shave and application of tincture of iodine on the table gives practically the same results. This application I make upon the operating table, after which washing away the iodine with alcohol. I mention this because it is claimed by many that iodine should be applied some time before the patient reaches the operating table. Hundreds of cases have demonstrated that two minutes is long enough clinically, even though it may not be so theoretically. Skin thus prepared will handle catgut without trouble, provided the proper size is employed in the proper manner.

The second objection can be met by using chromicized catgut, and after trying various sizes I have for the past two years employed the 00 chromicized gut practically exclusively. This is smaller than almost any other suture, and at the same time has enough tensile strength to hold the edges of the wound in coaptation. It should be remembered that skin sutures are for coaptation, and not for existing strain, and should there be unusual strain, as in breast amputations and removal of growths, there should be relaxation sutures, and perhaps a little larger chromicized catgut for the skin edges. The 00 chromicized suture will resist absorption in the skin for from seven to ten days without irritation or reddening.

Much depends upon the manner of placing catgut sutures. They should not be too closely placed or too tightly tied. Personally, I much prefer the continuous running suture, passing somewhat deeply into the subcutaneous fat, and taken at intervals of from one-half to three-fourths of an inch. Such a wound can be made to lie in perfect apposition, and at the same time can be pulled apart at any point, thus allowing free drainage by direct transudation between the wound edges. The serum thus exuded in drying out in the gauze makes an ideal splint for supporting the wound and should not be

disturbed until healing is complete. Blood serum dried thus in the gauze makes a dressing practically impervious to air and water. With the exception of supporting sutures in abdominal incisions, all wounds in my experience for years have been closed thus with catgut. The deeper layers in abdominal incisions are usually brought together with the 00 chromicized catgut used in two strands, or a little larger size. In no wound does catgut behave more satisfactorily than in those in the scalp, though many have contended that it should not be here employed. In extensive incisions for operations upon the brain it has been my practice for years to use the continuous catgut suture, which does away with the necessity for ligating vessels in the scalp, at the same time permitting them to close perfectly under one dressing. In hernias, kangaroo tendon is used in the deeper layers, and catgut in the skin. The extensive suture lines of breast amputations are closed with catgut, and the dressing is usually removed from the sixth to the eighth day for the purpose of removing the drainage tube, in which time but little further dressing is required. Even scrotal incisions in varicocele receive the same treatment.

In conclusion, we may ask, how much does it not mean to the patient to know that no stitches have to be removed, no dressings changed, and that after being taken from the operating table, there are no more harrowing or disturbing processes to be put through? In the end, too, it means much less work for the surgeon, much less dressings for the hospital, and an ideal result.

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#### THE SPECIAL VS. THE COMPLETE HOSPITAL.

With the "hospital unit" as our sole guide, the general hospital, with "a medical and a surgical side," and the special hospital, with its one-sided organization and its helplessness in the face of unexpected and complicated emergencies, pass muster as satisfactory hospitals; but, inasmuch as neither the general hospital which is composed exclusively of a medical and a surgical side nor the special hospital which is manned by a group of regional technicians, is prepared, in the treatment of its patients, to bring effectually to bear the combined resources of modern medicine, no hospital of either type should be created henceforth without a protest. And for the same reason existing hospital fragments, wherever and whenever possible, should be pieced together into whole and competent hospitals.

—S. S. GOLDWATER in *The Modern Hospital*.

# STRAIGHT DIRECT LARYNGOSCOPY, BRONCHOSCOPY AND ESOPHAGOSCOPY.

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BALTIMORE, MD.

(Continued from May Number.)

Brunings has devised a fixation instrument for attachment to his handlight which serves as a "counter-pressure" apparatus. After it is attached to the light, a broad metal piece is placed against the thyroid cartilage which is gradually forced back by means of a screw arrangement until a good view of the larynx is obtained. The advantages claimed for the contrivance are that it will work successfully in the most difficult case and the operator has both hands free. In his book he describes the method as follows: "The method of counter-pressure has for its object the diminution of autoscopic pressure, which, besides being an unavoidable inconvenience to the patient, limits the indications for direct laryngoscopy. Moreover, it renders possible the automatic continuation of the presentation of the larynx, and enables the operator to accomplish what has hitherto been impossible. As this method is important in practice and is quite new, a somewhat complete account of it is desirable. If the normal curve of autoscopic pressure (Fig. 16) is considered, the rapid rise of the section M-V, which in no wise corresponds with the progressive elasticity of organic tissues, is noticeable. There must therefore be some second factor at work in addition to the elastic resistance of the root of the tongue, which opposes itself to the gradual presentation of the larynx in proportion to the increased pressure. Exact measurements show that in all cases of autoscopic pressure the larynx, and especially the prominentia laryngis, move forward by 0.5 to 1.5 centimetres, a movement which, in the main, coincides with the rapid increase of pressure from M-V. In reality, not only a dislocation of the entire larynx, but also a sagittal stretching and tension of the vocal cords is involved. For if the patient is made to omit a continuous sound while strong displacement is exerted, the note aimed at always turns out to be from a half to a whole turn too high. The reason that the larynx yields to the autoscopic spatula is to be found in its firm ligamentous con-

nection with the hyoid bone, which transmits the displacement of the root of the tongue to it. If, therefore, by some special means this movement of the larynx can be prevented, the last 5 to 15 millimetres of displacement of the tongue will be saved, and the great increase of pressure necessary to produce it will be avoided. This auxiliary method can easily be so arranged that its application carries with it a further gain. By means of pressure in front exerted on the prominentia laryngis, the larynx can, without difficulty, be pushed from 5 to 10 millimetres farther back than the position which it normally occupies when the head is in the position required for direct laryngoscopy. If this displacement is added to the above, it must be possible, in specially favorable cases, to survey the entire larynx with a degree of autoscopic pressure which usually

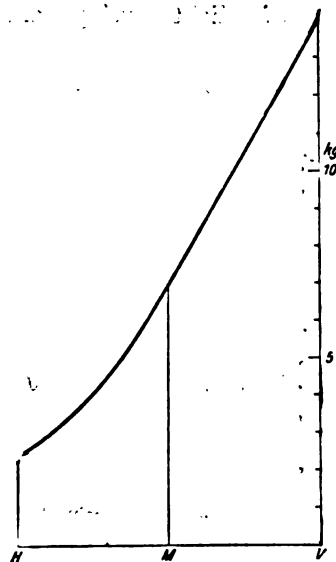


Fig. 16. After Brunings.

only brings into view the posterior wall. If the displacement necessary to bring into a straight line the angular passage between the upper row of teeth and the anterior commissure is remembered, it immediately becomes evident in what manner the counter-pressure can most advantageously be applied. Figure 17 represents graphically the three main features which are to be displaced (1, the teeth; 2, the root of the tongue; and 3, the larynx). The arrows show the direction in which displacement has to be effected. Now, if it is imagined that the counter-pressure at d operates on a prolongation of the electroscope handle v on the one hand and on the other hand on the larynx (3), it becomes plain that not only (3) is pressed backwards, but 2 is also pressed forward, as desired,

and 1 is pressed backwards, *i. e.*, through the counter-pressure the hand which holds the handle is relieved of work. At the same time the distribution of pressure, as indicated by the proportions of the lengths of the arrows, is favorable. One-half acts forwards on 2, and the other half, which is directed backwards, is distributed between 3 and 1 in the proportion of the lever lengths 2 to 3 and 2 to 1, so that 3 receives about one-third, and 1 about one-sixth, of the entire pressure. Figure 19 shows how counter-pressure is practically carried out. The counter-pressure instrument consists of a pressure plate which can be moved forward with one hand by means of a rod and a three-ringed handle. By turning the small lever *a* (Fig. 18), an automatic stop is inserted which causes the pressure plate to remain in any position required. This simple arrangement can be attached directly to the electroscope by means of a light envelope, and admits of

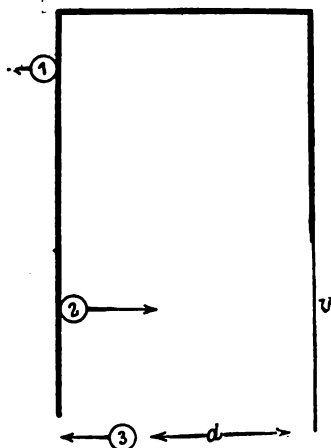


Fig. 17. After Brunings.

both the employment of the autoscopia spatula for adults and also of the spatula for children. In the latter case the pressure plate is simply turned upwards, so that its upper edge coincides with the end of the spatula. The method of using the counter-pressure instrument is illustrated in Figure 19, and, after what has been already said, requires no more explanation. The beginner is advised to carry out his first autoscopic attempts without counter-pressure, in order that he may acquaint himself with the difficulties of the older method, and be able to judge what degrees of pressure are permissible; for with the help of the counter-pressure instrument a simple movement of the fingers enables him to exert an extraordinary force, for which at first he has no proper measure. If, indeed, autoscopia after Kirstein's plan is often a trial of

strength on the part of the surgeon, so the counter-pressure method demands of him a corresponding sensitiveness of touch. The use of the counter-pressure autoscope does not in the first place differ from the normal procedure previously described. In the first stage the pressure rod must, of course, be completely withdrawn and, in the event of any difficulties of introduction, the pressure plate must be turned upwards. The second stage can only be carried out with some use of the counter-presser, which holds and directs the instrument. The beginner, however, is recommended to carry out the first part of autoscopic displacement without counter-pressure until the arytenoid cartilage is seen, and he has assured himself of the correct position of the spatula and knows how far to push it in, for only then will the pressure plate touch the right place, *i. e.*, the prominentia laryngis. It is obvious that all the rules applicable to the normal process of examination must also apply to the counter-pressure method. This applies also to the choice of a spatula of the right size, for the new method of examination is chiefly designed to make things pleasanter for the patient. I must now mention the advantages of counter-pressure autoscopia, which are partly capable of being mathematically demonstrated. For if the examination is first carried out normally with the dynamometric electroscope, and the counter-pressure instrument then applied to its

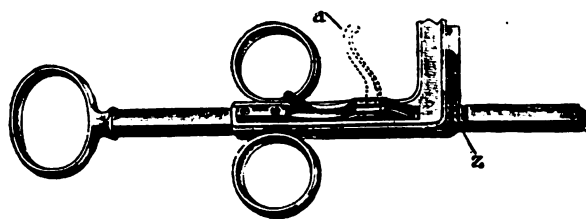


Fig. 18. After Brunings.

handle, a saving of pressure amounting to 40 to 60% will result. Only when much thicker spatulae are employed is the same amount of pressure necessary as was previously required. This is a great alleviation for patients who are difficult to examine, since it is just the second half of the pressure which causes pain. In cases where autoscopia is easy of application, the field of vision is considerably enlarged, because in such cases it is possible to work with a larger tube. It is an essential feature of the counter-pressure method that its advantages are greater in proportion to the desire to approach from the posterior laryngeal wall to the anterior commissure, and so inflict greater pressure of displacement on the individual. As regards indications for use, it follows that in very easy subjects the counter-pressure instrument may be used for

operations, demonstrations and lengthy procedures, and in moderate or difficult subjects it can be employed for brief diagnostic inspection. By this method I was able to remove a polypus situated on the anterior third of a man's vocal cord, although previously not even the posterior wall could be brought into view with an 8.5 millimetre tube. As I had not before come across a case in Killian's clinic so little amenable to autoscoping, it might almost be said that with the counter-pressure method the applicability of autoscoping can be reckoned at 100 per cent. A few months after the introduction of direct laryngoscopy, reports were made on the first laryngeal operations performed with this new method. Great hopes were held that autoscoping would introduce a new era of endolaryngeal therapeutics, because an organ which can be seen and reached directly has obviously a far better chance than if it is only visible as a reflected image in a mirror. This hope has not been entirely fulfilled, and the reason for this, as Kirstein had already remarked, is found chiefly in the fact that it is difficult to employ autoscoping and to operate at the same time. As a rule, two hands are required to bring the larynx into view, and if the instrument is to be used, one hand only, and that the left one, has to do all the work. This being the case, it is impossible to avoid pressing painfully on the teeth, and this makes the patient restless and easily spoils the view. If it is also remembered that the delicacy and fineness of movement of the right hand is considerably interfered with by the left hand being exerted simultaneously, then it is not surprising that even practiced users of the endoscope have hitherto preferred long curved forceps with the mirror to short straight instruments with the tube spatula. Soon after the introduction of autoscoping, various attempts were made to construct a self-holding autoscopic spatula tube. For instance, von Eicken had short tracheal tubes made with lateral windows for use with Kirstein's hypopharynx tube, and by this means he was able to present that part of the larynx which he wished to operate upon. I myself have worked some time with my "beaked tube," a half-open autoscoping spatula with a bayonet-shaped end, which offers a support to the instrument in the throat without reducing the field of view. The beak tube has been very extensively used, and is of great practical utility for small operations in the posterior laryngeal wall, such as galvano caustic punctures. But it fails like all other auxiliaries, in cases of operations on the vocal cords, more especially in the region of the anterior commissure. The main obstacle to direct endolaryngeal work is now

overcome by the counter-pressure method. For, in addition to enlarging the field of view, it renders the presentation of the field of operation and the operation itself independent of each other, so that attention can be given to, and both hands used for, the latter. In spite of this there are still limitations to

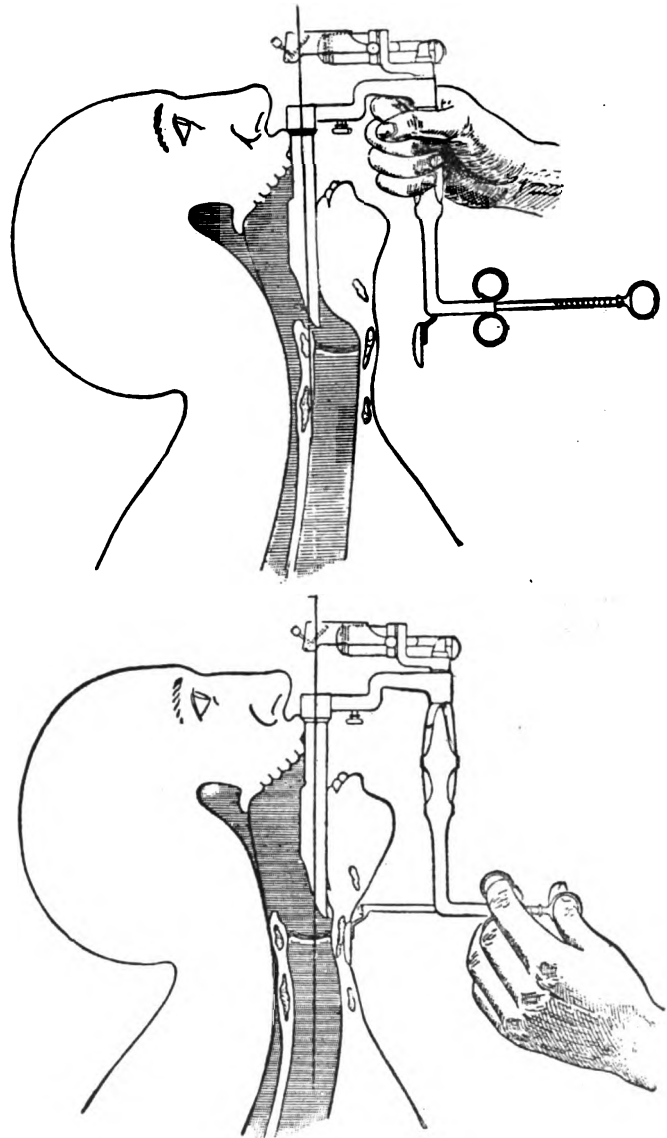


Fig. 19. The mode of action of the counter-pressure method—after Brunings.

direct surgical work on the larynx which I hoped in vain to overcome by means of a special operation autoscope. These limitations arise from two characteristic features of tube examination. In the first place, it is impossible to exert any considerable degree of lateral pressure with the end of a long thin instrument introduced through a tube, because the shaft has not enough play in the narrow tube. Secondly, the movements of the instrument in the direction of the tube are apt to be uncertain, be-

cause of the difficulty of judging depth with one eye only. As will be seen later on, it is possible to place against these unavoidable disadvantages such important advantages that direct operations have become an indispensable adjunct to the indirect method. I am accustomed to do the greater number of laryngeal operations by means of the counter-pressure autoscope. Foremost among the advantages is the immovable position of that part of the larynx which is presented in the tube, and the protection of the adjacent parts which is so desirable in cases where the galvano-cautery, local applications or *x*-rays are used. In the case of the galvano-cautery, which I employ mainly for "deep puncture" as recommended by Grunwald, "counter-pressure enables the surgeon to make the puncture exactly perpendicular to the surface. As is well known, the majority of tuberculous infiltrations, in the treatment of which deep puncture is strongly indicated, are found in the posterior part of the larynx in such a position that, by the indirect method, the instrument can only be applied in a more or less tangential direction. The cautery therefore always produces, apart from the uncertain depth of puncture, more extensive destruction of epithelium than when it is directed perpendicularly through the tube on to an operation field presented *en face*. For the application of other caustics (trichloroacetic acid, chromic acid), autoscopy also affords the advantage of complete immobility and the absolute protection of the adjacent parts. For this reason the treatment can not only be localized in the most exact manner, but can be allowed to act for a long time without the other side of the larynx being touched. By this means I often try to promote the cicatrization of tuberculous ulcers if lactic acid proves to be ineffective, and also employ it for the bases of non-malignant growths after their removal (papillomas, pachydermias.) In the gradual progressive dilatation of laryngeal stenoses, the autoscopic method offers, in certain cases, advantages over the indirect procedure. It is especially advantageous in the case of young children, where it is impossible to use the mirror, and where the surgeon has consequently been obliged, hitherto, to introduce the dilator by feeling. As it is a question of overcoming considerable resistance, "bougieing" is only free from danger when controlled by the eye and this is rendered possible by the autoscopic method. For the stenosis treatment of young children, which is usually undertaken only after a previous low tracheotomy, I employ English urethral catheters, from the smallest size up to about 10

millimetres. The instrument is fitted with a stiff mandrin (either wire or steel wool carrier), and is then guided into the larynx, which has been previously cocaineized; it is best to pass the catheter by the side of the tube as otherwise it interrupts the view. As the catheter is not easily bent, it is possible for considerable pressure to be exercised in a longitudinal direction. After overcoming the stenosis the mandrin is drawn out, and the flexible catheter allowed to remain in position for an hour. A rubber tube drawn over the catheter prevents it from being bitten. As soon as a certain lumen has been attained, the catheter can be passed with "half-autoscopy." By this I mean the prelaryngeal presentation of the epiglottis, which has been already fully described. If the lower 2 or 3 centimetres of the mandrin have been bent, it is easy



Fig. 20. Counter-pressure autoscopy (with telescope)—after Brunings.

then to carry the instrument under the accurate guidance of the eye round the epiglottis. In this way the larynx is readily entered, and a considerable pressure can be exerted. By this process I have overcome almost complete stenoses of the larynx and of the subglottic space, although this only succeeds where the stenosis is very short or diaphragmatic in form. The treatment must be extended, with increasing intervals, over a period of one year or more. In adults, autoscopic dilatation only comes into consideration for very narrow diaphragmatic stenoses, where the finest of the Schrotter catheters is unable to pass. In the dilatation treatment of laryngeal stenoses, due to scar tissue, I have never seen any improvement with fibrolysin. It may be mentioned here that, in peroral intuba-

tion by the O'Dwyer and the Kuhnt method, "half-autoscopy" may occasionally be employed to advantage."

The writer has quoted Brunings at length to show the difference between his methods and those advocated in this monograph; he has never used the counter-pressure apparatus and must therefore discuss it from Brunings' standpoint. It will be noted that he praises it particularly for operations in the anterior part of the larynx. With the methods of the writer, described above, it is never necessary to use an instrument to force the larynx backwards for the anterior commissure is always seen through the small instrument. The writer can conscientiously claim that with his methods, he has never failed to get a good view of the entire larynx at the first sitting except as stated above in one patient with chorea. He has repeatedly removed tumors in the anterior commissure which he believes would have been inaccessible by other methods. After such experiences, the writer feels that a complicated "counter-pressure" apparatus is not essential to successful work. His argument that two hands are, as a rule, required to bring the larynx into view is not borne out by the writer's experience. Formerly when large tubes were introduced between the incisor teeth, it was the rule to see only part of the larynx and successful operating was out of the question; with the small tube and the straight position of the head, this objection no longer holds true. The writer has repeatedly demonstrated that practically no force is exerted on the tube to see the anterior commissure and often the weight of the instrument almost seems to do this. All patients are easily examined with the writer's methods and operations are performed with ease. These criticisms are not directed at Brunings' particularly; the same objections apply to any method of direct laryngoscopy in which the tube is introduced between the incisor teeth. It will be noticed that his method of treating laryngeal stenosis differs materially from that suggested by the writer. It would seem that there could be no argument advanced in favor of intermittent dilatation when the continuous dilatation is so easily obtained with retained intubation tubes which in the hands of the writer has been so successful. In children particularly intermittent dilatation would seem far inferior to intubation tubes because the frequent treatments ought to upset the child's nervous mechanism. In the intubation treatment the tube is removed every two weeks; in the other treatment it is probable that dilatation is carried out oftener and it must be more painful than the former

procedure. If one will notice the position of the head in Brunings' book for the supine and sitting positions, he will see at once what the writer has tried to emphasize throughout this chapter, that the head is too far back for easy work; in his position the head is thrown back on the muscles at the back of the neck which are more or less strained through the examination. When one compares this position with the natural position of the head in the straight position, the superiority of the latter is easily apparent. It is evident that the laryngoscopes that Brunings uses for ordinary work are too large, like the majority of the instruments in use at the present time, so an expensive apparatus has to be attached to force the larynx back so that the anterior part may be seen. The straight position of the head and the use of the 10 millimetre tube makes

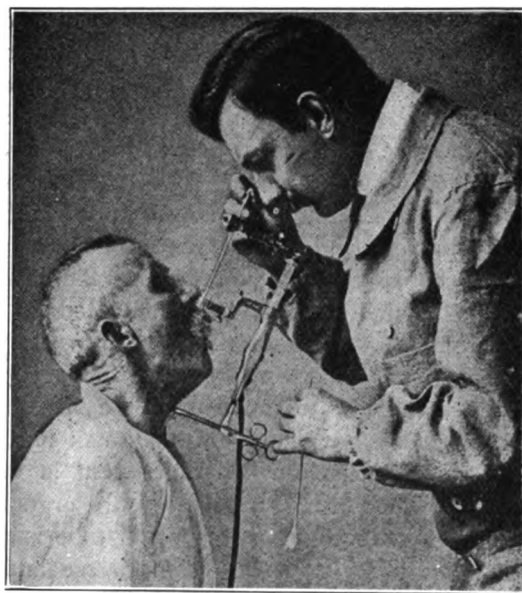


Fig. 21. Direct operation on the larynx by means of counter-pressure autoscopy—after Brunings.

all this unnecessary; one can work in every case with ease and certainty and with the knowledge that his patient is perfectly comfortable. Brunings' book is the latest foreign work on this subject so his methods are referred to as the latest in use in Europe. It will be seen that the positions of the head do not vary much in Europe and in this country; they seem to be practically the same throughout the world and all have the common fault of forcing the head back and making much more difficult a procedure which should be one of the easiest in surgery. For these reasons it seemed to the writer that a monograph, describing the straight methods as originated by himself might not be out of place. A few days ago the writer had a patient from a neighboring city who had been hoarse for five years.



Examination with the mirror showed a tumor on the left vocal cord just at the anterior commissure—a position which is admittedly most difficult to operate upon. The larynx was deadened with 20% alypin solution and the small tube passed without difficulty. There was no trouble exposing the anterior commissure and in a few minutes the papilloma was shaved off with straight forceps passed down at right angles to the cord. The writer is sure that with any other tube the tumor could not have been as quickly and as easily removed. The patient had a short, thick neck and did not tolerate the tube well. It would have been impossible to use the Jackson large or small separable speculum. The writer does not report cases to exploit any special skill on his part but to emphasize the ease with which the small tube can be used. He knows, after having tried all sorts of instruments, that his modified tube has solved all the problems connected with direct laryngoscopy. With it most laryngologists see the entire larynx at the first attempt and a week's practice is all that is needed to perfect one in the use of the instrument. When the tube was exhibited at the meeting of the American Academy of Ophthalmology and Oto-Laryngology in August, 1912, and its advantages pointed out, there were some who thought it was too small; but if the writer succeeds in convincing a few laryngologists that one does not require a large tube for laryngeal work and that the disadvantages of the large tube far outweigh the advantages of the small one, he will feel fully repaid for the time spent in writing this little book. After all the only argument that can be advanced against a small tube is that one may not have sufficient room to see and to operate through at the same time. The answer is that one soon learns to operate as easily through the small as through the large tube. For diagnostic purposes there can be no argument against the smaller instrument because it is a self evident fact that it is more easily introduced. The writer's articles on the subject have been appearing for the past four years but only recently have laryngologists shown any desire to take up the straight method. That, once mastered, it will be used to exclusion of all other methods, the writer is certain because it is the easiest and most practical of all methods. This statement is made after a personal experience with all other methods and it can be substantiated by actual clinical work. In the operative cases cited above, it will be seen that the operative work embraces all parts of the larynx; that it is as easy to remove tumors from the anterior commissure

and vocal cords as from the posterior commissure. No other instrument with which the writer is acquainted will allow this in every case. Success is largely due to the straight position of the head which the patient can tolerate indefinitely. In doing his work, the writer does not prefer any special table. Any operating table, high or low, will do and in different hospitals all kinds of tables have been used successfully. The writer has laid great stress on direct laryngoscopy because one must have a thorough knowledge of it if he would do bronchoscopy and esophagoscopy and because he deems it of the utmost necessity to emphasize the importance of learning the straight or easy as opposed to the extended or difficult methods. As this book is intended principally for beginners and has for its purpose the simplification of work which is generally considered difficult, these remarks are pertinent. In the next chapter on tracheo-bronchoscopy, the straight method will often be referred to for the writer uses it as the beginning of the passage of the bronchoscope in every case. The straight position of the head is insisted upon even in the examination of the upper end of the esophagus as being the cardinal principle of all tube work.

*(To be continued.)*

## MILITARY SURGERY.

BY GUSTAVUS M. BLECH,  
CHICAGO.

*(Continued from March issue.)*

The majority of military surgeons are agreed that at the front the principal therapeutic measures to be instituted are:

- (1) Absolute rest.
- (2) Complete abstinence from food and drink for at least forty-eight hours; and
- (3) Protection against infection.

In order to appreciate the difficulties which beset medical officers in the field, it is necessary to discuss the above-mentioned measures somewhat in detail.

*Absolute rest.*—A soldier shot in the abdomen by a jacketed bullet and left on the battlefield in a helpless condition without any attention for several hours has in all probability a better chance for recovery than the wounded who is at once picked up and carried some distance for surgical aid, provided, of course, no vessel of importance has been injured producing a serious internal hemorrhage.

The importance of rest for patients with abdominal wounds has caused several writers to advocate in all earnestness to leave them on the field and to detail hospital corps men to provide shelter and at-

tention for a time until it is felt that transportation is safe. If it be realized that the services of the sanitary personnel are strained to the utmost after an important engagement and that tactical situations may preclude the presence of non-combatants on the firing line, no proof is needed to show the impracticability of such a proposition.

Transport cannot be avoided, especially in winter time, but it must be reduced, as far as its harmful aspects are concerned, to the greatest possible extent.

The writer has taught the litter-bearers of his command to caution their patients to completely relax and remain passive while being lifted on the litters, to carry the loaded litters as gently as possible to the nearest station, and to undertake even that only after the administration of a liberal dose of morphin hypodermatically. In the event the drug cannot for some reason be injected under the skin it should be administered by mouth, even though this apparently violates the law not to administer a drop of water.

Morphin in gunshot wounds of the abdomen is what a splint is to a fractured extremity, and I am convinced that without it many wounded soldiers that have reached the field hospitals or dressing stations and made eventual recoveries would have died on the transport or soon after reaching its destination.

*Complete abstinence from food and drink.*—This must be followed explicitly. Most patients suffering from perforated gunshot wounds of the abdomen suffer intensely from thirst and beg pitifully for a swallow of water from the tempting canteen. I can find no better way of warning than to repeat the instructions I have given my men: "Any one of you who will yield to such pleadings is gambling with human life, and will be placed before a court-martial on a charge of murder."

Civilian surgeons will be apt to ridicule such drastic teachings to sanitary soldiers, who, it must not be forgotten, are laymen. How often have patients after laparotomies taken liberal quantities of water when not observed by the nurse and lived to laugh at our "science"? This has happened to me on two occasions and no peritonitis resulted. In one instance the patient vomited soon after the draught and had no further trouble whatever. In both cases the section was done for the removal of an acutely inflamed appendix.

But there is a vast difference between an aseptic wound by a surgeon's sharp knife producing a minimum of trauma to the tissues involved and a wound produced by a missile.

Statistics are easily forgotten and I will therefore restrict myself to narrating one instance during the Boer war in Africa which plainly illustrates my point.

An English medical officer and a line officer were shot through the abdomen, and an hour or so later found side by side by soldiers. The line officer begged for a drink and the canteen was placed against his lips. The same was handed the wounded surgeon, but though he suffered as much as his comrade, he remembered his teachings and energetically waved his would-be Samaritan aside. The doctor recovered—the line officer died, though both had similar injuries and were placed in the field hospital at the same time.

*Protection against infection.*—The small wounds of entrance and exit produced by jacketed bullets require a simple dressing such as is afforded by the sterile first-aid packet. Whether the wound margins should be painted with iodine, as is advocated by some writers, or let alone, is, in my opinion, of no moment.

Of greater importance is a recent contribution in the *Military Surgeon* by Col. Jacob Frank, Surgeon-General of Illinois, the well-known Chicago surgeon, who maintains that the treatment of covering the abdominal wounds with aseptic dressings is all wrong. Indeed, his idea is revolutionary in character.

Frank correctly maintains that when a man has been hit by a missile of small caliber it is not always possible to tell whether viscera have been perforated or not, in the absence of symptoms unmistakably pointing to perforation. He demands that all abdominal gunshot wounds should be looked upon as perforating ones, as far at least as treatment is concerned, in order to run no risks of a false diagnosis. By applying a sterile dressing we protect the wound channel against infection from without, but at the same time we occlude the wound and allow the peritoneum to be overwhelmed by infection from within. He believes that the appearance of intestinal flora in the free peritoneal cavity plus the possible pouring out of intestinal contents will produce peritonitis in a very few hours. He further maintains that the reason so many soldiers have died after laparotomy in the fields hospitals is not to be found in the inability to perform this operation aseptically, but in the fact that the operation is performed too late.

Frank, basing on many animal experiments and his numerous observations in civil practice, advocates early drainage and is opposed to aseptic occlusion. His technic is simple. As early as possible

after receipt of injury the wound of entrance (exit, if the man is shot through the back, G.M.B.) is to be drained by the insertion of a piece of gauze wicking. If the wound is too small for the insertion, it should be enlarged with a sharp knife or dilated with artery forceps. The wick should be pushed into the abdominal cavity with some suitable blunt instrument. Frank recommends that one end of the first aid bandage be used as a wick (rolled as such between the fingers) and the rest used as an ordinary dressing or bandage which will prevent the wick from becoming lost in the abdominal cavity. He has so much faith in the efficacy of early drainage that in the absence of a regulation first aid packet he would not hesitate to use any ordinary piece of clean linen, such as a strip torn from a shirt.

Frank makes only one demand and that is that this treatment must be administered very early, not later than two hours after the occurrence of the injury. For this reason he advocates that all combatants should be given proper instruction, so that self help or help by a combatant comrade may be on hand on the firing line proper, if that cannot be reached by the sanitary personnel during the battle, a thing out of question under modern conditions of warfare.

It goes without saying that when sanitary personnel do reach the injured they should resort to the same method.

Frank believes that infection will be prevented or minimized by allowing the escape of all infectious matter, no matter of what character, and that in all perforations of the hollow viscera the transport will be robbed of its horrors, as the gases have an opportunity to escape, I presume, somewhat in the manner of an artificial fistula in excessive tympany, and distention of the bowels and stomach will be lessened thereby.

If I am permitted to comment somewhat on this teaching, I may say that theoretically at least the idea is sound. If it can be demonstrated by animal experiments—and this the writer will do in the near future—that the problem will work out in practice as well, then Colonel Frank will have rendered the science of military surgery a great service.

On first blush, it would seem that Frank is violating the law of "non nocere," as the rolling of the sterile gauze into a wick by dirty fingers—and in the field the fingers of all who cannot disinfect them will be dirty—but there is of course a great difference between dirt in the ordinary sense and infectious material, and Frank maintains that the endogenous infection by, let us say, the colon bacillus is so much more dangerous, that contact infection

loses its significance, especially in view of the fact that the wound is left open for the purpose of drainage.

Of course even that danger could be eliminated to a great extent and even the very remote danger from tetanus, if the government would add a long piece of wicking and an applicator to the first aid outfit.

The principle of drainage is favored by practically all authorities when the external wounds are large.

The following general rules can be accepted as axiomatic for frontal aid stations:

(1) If the abdominal wound is large and the viscera do not protrude, gauze drainage is imperative. At the regimental aid stations it is best to tamponade such wounds preparatory to transport. Sutures of fascia, muscles, and skin can be undertaken at the dressing stations, where the facilities for emergency surgery are better.

(2) Prolapsed bowels, if not otherwise injured, should be cleansed with great gentleness by a piece of sterile gauze and returned to the abdominal cavity. It is imperative that all forcible manipulations of the prolapsed intestine be avoided. A simple and effective way to cause reduction is to separate and lift up the wound margins and to allow the bowels to fall back by gravitation. Occasionally the improvised Trendelenburg posture will be found helpful.

(3) In the event the prolapsed bowel is found to be injured, intestinal suture should not be undertaken at the front. It is best to secure the exposed bowel loops by means of a piece of gauze strip, so that they cannot escape back into the abdomen, and apply voluminous dressings, to protect against injury. Such patients should be sent to the rear with a special message indicating the nature of the injury where suture or resection can be performed in *lege artis*.

(To be continued.)

#### SURGICAL TRAUMA AND INFECTION.

The question frequently arises in the minds of operators why in two clean operations done for the same thing under similar circumstances one becomes badly infected and the other heals *per primam*? It is chance; the number and virulence of bacteria entering the wounds may be the same; the amount of damage done by the operations may be the same, the total resistance of the two patients may be the same, and still one may suppurate and the other heal. If a devitalization is done at point A and if the few bacteria admitted are lodged at point B, which is healthy, no infection occurs. But if they lodge at point A, the two factors necessary for infection meet, and infection cannot fail to follow.—W. A. BRYAN, in *The Southern Practitioner*.

## NOTES ON A CASE OF ACUTE POST-OPERATIVE DILATATION OF THE STOMACH.

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CINCINNATI, O.

It is a fairly accurate observation that the less sharply defined our knowledge of the pathology or etiology of a lesion, so much greater is the mass of literature on the subject. Until a problem in pathogenesis is solved, however, each new fact or observation has a definite value, and should be reported. Therefore, the following case is related. Certain features are of interest, and the accompanying radiograph is, to the best of my knowledge, the first to be presented in reports of post-operative dilatation or atony of the stomach.

CASE:—A well-built, well-nourished white man, aged 18 years, was brought to the City Hospital, May 4, 1912, on the service of Dr. S. P. Kramer, with a stab-wound of the left side. He had had a fight, in the course of which he was stabbed from above downward with a "Barlow" pocket-knife. He had been drinking, but was not intoxicated.

His head, neck, and extremities were found normal, his heart sounds clear and strong. The right side of his chest was also normal. The abdomen was distinctly rigid over the upper and left quadrant, but only slightly sensitive.

On the left side of the chest, in the tenth intercostal space and anterior axillary line was a small stab-wound, which undoubtedly penetrated the abdomen, for a small piece of omentum was seen protruding through the wound.

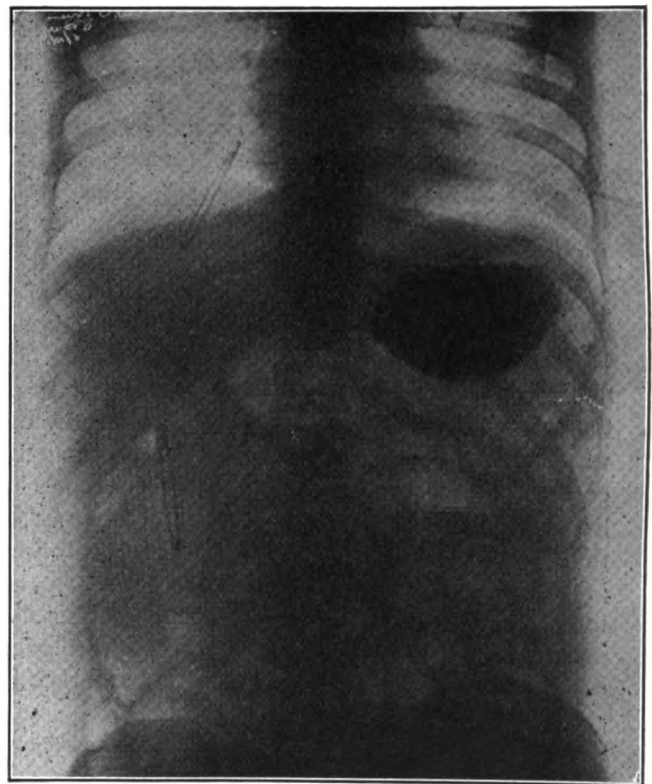
Expansion of the left chest was limited, but normal resonance seemed to be present and the breath-sounds were present over the whole lung, but not as clear and strong as on the right side. Temperature, 97.4°; pulse, 96; respiration, 24.

I saw the patient about one hour after his admission to the hospital, and because his wound evidently penetrated the abdomen, and because he had increasing abdominal rigidity and pain, I operated immediately:

Ether anesthesia, by drop method. Incision through left rectus sheath, in epigastric region, about four and one-half inches in length. The abdomen was thoroughly explored in the neighborhood of the upper left quadrant. The intestines were found distended, but no hemorrhage or visceral lesions were discovered. The omentum was replaced in its normal position, after removing the

infected portion which protruded through the stab-wound. A drain was placed in the stab-wound and the laparotomy incision was closed. There was no rough manipulation of the viscera, no greater pulling or dragging upon mesenteric attachments than is usual in other intra-abdominal work. The patient returned to the ward in very good condition; he was given a hypodermatic injection of morphine, grain  $\frac{1}{4}$ , and he had a comfortable night. The morning after the operation he had a temperature of 98.8°, pulse 72, and respiration 20.

He continued in good condition until two days after operation, when he became restless and vomited four ounces of dark green material, thought by the nurse to be fragments of pickles. He was very noisy and begged for water, which was given him *ad libitum*. He complained of pain in his left



side and his temperature rose to 100°, pulse 104, respirations 30. Drain removed. His restlessness and thirst became very severe, and the vomiting occurred again, six ounces of the same greenish material. The interne gave him morphine, grain  $\frac{1}{4}$ , and he slept through the night. The third morning the vomiting and restlessness continued, and the vomitus assumed a fecal character, with a very foul odor. Urinalysis showed normal urine and he was voiding sufficient quantity. I found his abdomen great distended, but fairly soft and with no mass to be demonstrated, and tympanitic over the

whole extent, with no abnormal peristalsis; pulse 116, respirations 30. I ordered a turpentine enema given immediately, and the patient expelled a large amount of flatus, but no stool.

Fearing post-operative paralytic ileus, or acute dilatation of stomach, eserine salicylate and strychnine sulphate were ordered, together with gastric lavage. The orders in regard to the eserine and strychnine were assiduously carried out, but the lavage was entirely neglected.

The lad's appearance was not that of a desperately sick patient, but his vomiting, which now became very frequent, and the advent of severe hiccough, coupled with the abdominal distension which enemata and rectal tubes failed to relieve, provided a gloomy prognostic picture. At no time from now on did his temperature rise above 99.6°, running very frequently subnormal, as low as 97°; but his pulse rate continued elevated, between 90 and 120, usually over 100, until late in the course of his illness.

On the fifth day after his operation he was given bismuth subcarbonate, 2 ounces, in a bottle of bovilac, and his abdomen was x-rayed twelve hours later, by Dr. Sidney Lange, to whom I am indebted for the plate here reproduced.

The radiograph shows the condition very clearly. There had been absolutely no attempt on the part of the stomach to empty itself, and none of the bismuth has passed even beyond the cardiac half of the stomach. It lies in the concavity formed by the vertebrae and ribs of the left side, and the atonic gastric musculature has not had force enough to lift it over the vertebral column. There is gas in the intestines, but the sacculi of the large intestine are fairly sharply defined, and as the boy was passing flatus, it is fair to assume that the paresis did not involve the large intestine. On the sixth day the patient had a stool and from then on rapidly progressed to recovery.

In reviewing this case certain features stand out in contrast to the reported cases, chief among which are the discrepancy between the patient's appearance and the gravity of his symptoms, and the fact that the urinary secretion was undiminished.

The pathogenesis of this case would seem to fall under the neuropathic theory of gastric dilatation, inasmuch as we have here a diaphragmatic lesion in all probability involving either directly, or in its reparative process, some fibers of the solar plexus. That this lesion must have been of considerable bacterial or mechanical irritability is evidenced by the rapid effort on the part of the omentum to wall it off, for even in the short time between the patient's

injury and his admission to the hospital the omentum had worked itself into the wound. The occurrence of hiccough could be explained as phrenic nerve irritation, but the continued abdominal distension might also produce it in the absence of any such direct irritation.

Although this patient recovered with no treatment except eserine and strychnine and enemata, gastric lavage should never be omitted.

Indeed, if gastric lavage were used as a routine following all abdominal operations, performed either on the patient's return to the ward or, better still, while on the table, we would not only lessen the post-operative vomiting and discomfort, but in a large measure would also prevent the occurrence of post-operative dilatation of the stomach.

4 WEST SEVENTH ST.

#### A SIMPLE REDUCTION OF SHOULDER DISLOCATIONS.

My mode of procedure is the acme of simplicity, and is as follows: Having divested my patient of all clothing necessary—it is not always requisite to remove the vest and shirt—I place him on the ground in a sitting position and grasp the wrist of the injured side, the third party doing the same with the sound one. We then raise both arms straight above the head, taking care to keep them parallel, and extending them upwards till the patient is just raised from the ground, at which point a click is heard and felt and the dislocation is reduced without further manipulation, except that occasionally in cases of subscapular dislocation it may be necessary to slightly rotate the arm from right to left in the case of left, and from left to right in that of the right arm. These movements are, of course, carried out during extension.—JULIUS CAESAR in *The Lancet*.

#### PAINFUL HEEL.

Painful heel is frequently due to an exostosis, a spur, on the bottom of the calcaneum. In cases of long standing rebellious pain under the heel, it is wise to radiograph in order to see whether this lesion is present. While we sometimes find this condition in patients complaining of no pain under the heel, it has been pretty well demonstrated that removal of these spurs when present in "painful heel," is followed by abatement of symptoms. Before, however, such spurs are removed, the attempt should be made to take pressure off from them by means of well-fitting arches, felt rings, or other devices designed to take weight off from the painful heel.—E. S. GEIST, in *The Saint Paul Medical Journal*.

## INSTRUMENTS FOR MEASURING JOINT MOVEMENTS AND DEFORMITIES IN FRACTURE TREATMENT.

H. C. GIFFORD, M.D.,  
SYRACUSE, N. Y.

The instruments described below were evolved by the author in response to his own needs in fracture work.

While they have only an interest in curative value, they serve as a guide to the results of treatment; they are a source of intense interest to the patient in the progress of his case, and they constitute at least a step in the reduction of the treatment of fractures from the inexact art it has always been to the more exact science it is bound to become.

No figures are given of average measurements in a series of individuals because the instruments apply only to the extremities, of which there is usually a sound side that forms a better criterion of the normal motion of the injured member than does

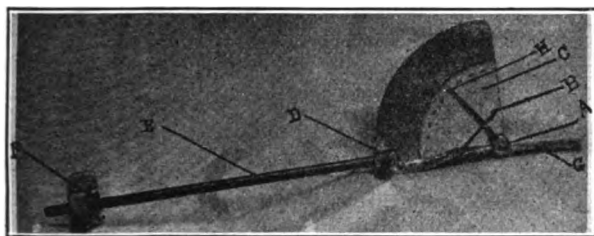


Fig. 1.

that of the corresponding member of other individuals.

### I. INSTRUMENT FOR MEASURING THE LATERAL MOVEMENTS OF THE ANKLE JOINT (FIG. 1).

A hinge (A), fitting into the groove between the external malleolus and calcaneum, is attached to a band (B) lying along the outer surface of the malleolus. Attached laterally at right angles to and centered to the hinge of this band is a quadrant (C). At the proximal end of the band is a socket (D), into which is set a rod (E) long enough to reach the calf. Near the proximal end of this rod is adjusted a shouldered piece (F), which sets against the postero-internal border of the tibia. The lower leaf of the hinge consists of a plate (G), which lies upon the lateral surface of the calcaneum. To the portion of the hinge (A) formed by the plate (G) is fixed a pointer (H), which indicates along the quadrant the degrees of movement as the foot is abducted and adducted.

### II. INSTRUMENT FOR MEASURING THE FLEXION AND EXTENSION OF THE FOOT, ALSO THE POSITION OF THE FOOT WITH REGARD TO THE LEG, ANTERO-POSTERIORLY (FIG. 2).

The requisite parts of this instrument are: (1) a part for indicating the line of the leg; (2) a part for the line of the foot; and (3) a part for recording the movement between the first two.

The line of the leg is best taken along the postero-internal border of the tibial shaft and internal malleolus; the line of the foot between the ball of the heel and the ball of the great toe.

An appropriately shaped clasp (A) resting against the postero-internal border of the tibia at a given distance from the tuberosity, is adjusted to a longitudinal rod (B) lying along the groove between the internal malleolus and heel, snugly against the former. The second part consists of a

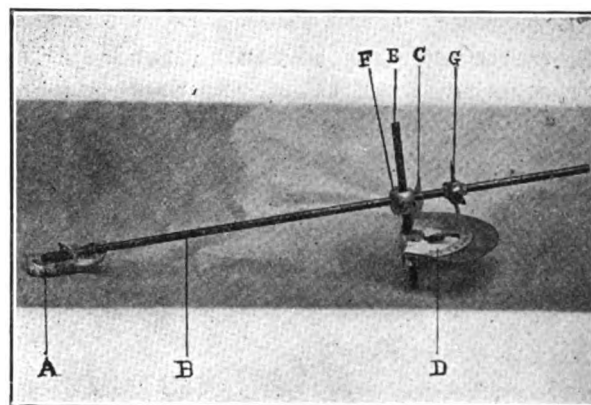


Fig. 2.

band (C) beneath the heel and toe. At right angles to this band is riveted a quadrant (D) centered to a second rod (E) held perpendicular to (B) by a double socket (F). The third part consists of a pointer (G) held parallel to the rod (E) by a socket similar to (F). As the second part revolves around the rod (E) the degrees of movement are indicated on the quadrant by the pointer.

The instrument is adjustable to either leg for the purpose of comparison.

For estimating the position of the foot with regard to the leg antero-posteriorly, as in Pott's fracture, the most dependable landmarks are the line of the tibia described above and the tubercle of the scaphoid, while the feet are in the same degree of flexion and extension.

First: Mark the tubercle of the scaphoid on both feet with a small cross, the limbs of which are equidistant from the edges of the tubercle.

Second: Take the angle of flexion of the injured foot.





# NON-DESCENT OF THE CECUM OCCUR- RING IN A CASE OF ACUTE APPENDICITIS.

ROYALE H. FOWLER, M.D.,  
BROOKLYN, N. Y.

R. R., station agent in employ of Long Island Railroad was seen in a consultation with Dr. N. S.

There were rigidity and tenderness in the right upper quadrant, somewhat low for gall-bladder infection and high for appendiceal. High appendicitis was diagnosed.

The patient was removed at once to the Southampton Hospital and subjected to operation. The abdomen was opened through a modified McBurney incision, and after a rather protracted search I came

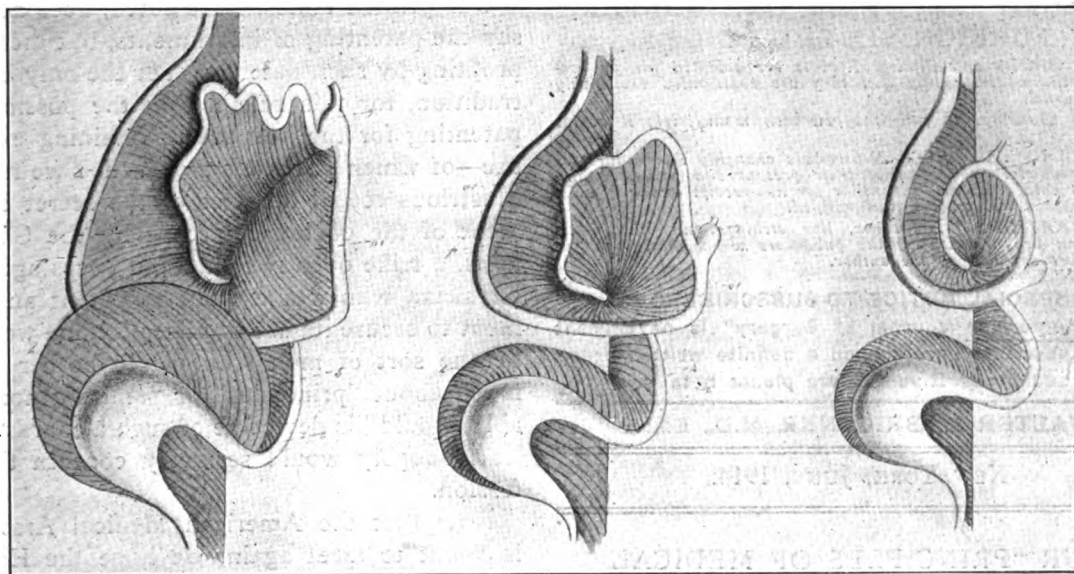


Fig. 1. Three successive stages of the digestive tube and the mesenteries in the human fetus: 1, Stomach; 2, Duodenum; 3, Small Intestine; 4, Colon; 5, Vitelline Duct; 6, Cecum; 7, Great Omentum; 8, Mesoduodenum; 9, Mesentery; 10, Mesocolon (modified from Tourneux).

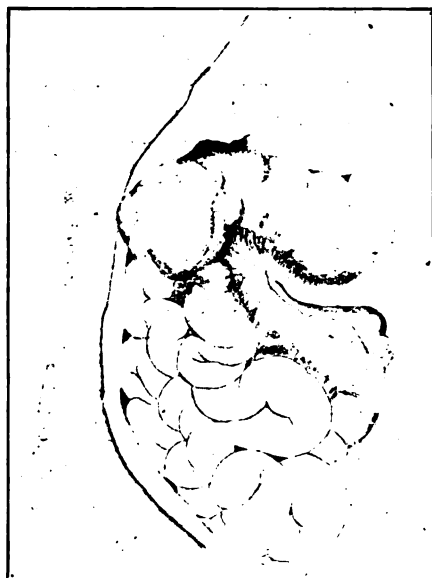


Fig. 2.

Wadhams July 31, 1912, at Westhampton Beach, New York.

He had been ill for two days. His chief complaints were peri-umbilical cramps and vomiting. The temperature was 101.4°; pulse 110, respiration 26.

upon a condition which is illustrated in Fig. 2. The appendix was adherent through its entire length to the posterior cecal wall. It is to be noted that the cecum in addition to preserving the fetal position, showed the persistence of the conical type. The appendix was bulbous at the end, constricted at its middle. It was excised unruptured, the base tied off and the wound closed around a small cigarette drain, inserted into the bed which the appendix had occupied. Upon splitting the appendix it was found to be distended with pus. Following a superficial infection, the wound healed. When the patient was last seen in October, 1912, he was in vigorous, robust health carrying on his duties, perfectly cured, without bulging at the site of the incision, and with no symptoms referable to the non-descent of the cecum. Figure 1 shows the various stages of the developmental point of the cecum.

## PERICARDITIS SIMULATING ABDOMINAL DISEASE.

Pericarditis may give rise to pain and tenderness in the epigastrium, with vomiting and with rigidity of recti, and may simulate abdominal disease. Lesions of the spine and spinal cord sometimes produce abdominal pain, and may simulate gastric ulcer, especially when vomiting is present.—R. J. M. BUCHANAN, in *Medical Press and Circular*.

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**WALTER M. BRICKNER, M.D., Editor**

NEW YORK, JUNE, 1914.

## OUR "PRINCIPLES OF MEDICAL ETHICS."

We believe in the practice of the highest ideals of medical ethics, and we would not wish to relax a jot in the strictest application of any detail of the principles of those ethics that is based on common sense or reflects the proper professional spirit. But, believing also that our code of medical ethics lost much of its great dignity when it was transmuted from the unwritten expression of the professional conscience to a printed primer of precise "principles," we must protest against one of these "principles" that is absurd, archaic and inconsistent.

We would again call attention to Chapter II., Article I., Section 5 of the revised Principles of Medical Ethics of the American Medical Association, published two years ago:

It is unprofessional to receive remuneration from patents for surgical instruments or medicines; . . .

This rule would mark as unprofessional, by our standard, the great Paul Ehrlich, who has received a royalty on every ampoule of salvarsan and neosalvarsan. Why is it "unprofessional" to receive a remuneration from patents on surgical instruments? Why is it not equally "unprofessional" to receive royalties from medical books, equally sold to professional brethren? Why is it not equally "unprofessional" to receive fees for instructing undergraduate and post-graduate stu-

dents? The Hippocratic oath proscribes the taking of such fees, and the professor who administers that oath at graduation exercises draws his salary from the students' pocketbooks! The proscription against royalties on instrument patents is as outworn in principle as the Hippocratic proscription against fees for tuition.

Our printed ethics, be it noted, does not gain-say the patenting of instruments, but merely the profiting by such patents. Yet the only basis, in tradition, for this rule lies in the possibility of patenting for the purpose of retaining exclusive use—of which mischievous practice we have the illustrious recent instance of the secret employment of the obstetric forceps by the Chamberlains, a trifle over two hundred years ago. Any physician who would want to patent an instrument to secure its use to himself alone would not be the sort of man who would bother himself much about "principles" or "ethics"; nor, probably, would his device be of such a character that its monopoly would seriously concern the profession.

Now that the American Medical Association is about to meet again, we hope the House of Delegates will omit this sentence from Section 5 or, if something about patents must be said, amend it to read:

It is unprofessional to patent surgical instruments or medicines for the purpose of preventing their manufacture and sale.

Although this is the only "principle of medical ethics" which ought to be omitted because it is wrong, there are several others that ought to be omitted or altered because they are silly.

Chapter II., Article II., Section 3, says:

When a physician or a member of his dependent family is seriously ill, he or his family should select a physician from among his neighboring colleagues to take charge of the case.

Probably the sick physician has many patients in more or less distant communities. Why less than they may he not feel privileged to select his medical attendant outside of his neighborhood? If he does not want any of his "neighboring colleagues," why "should" he (and of course he won't) "select a physician from among" them? However, he may console himself, if he does not break this rule, with the surprising information that

Other physicians may be associated in the care of the patient as consultants.

This is gratifying, but not enough. It should also be stated that the sick physician may employ a trained nurse if he can afford it.

## Chapter II., Article IV., Section 1, says:

The physician, in his intercourse with a patient under the care of another physician should observe the strictest caution and reserve; . . . nor should the course of conduct of the physician, directly or indirectly, tend to diminish the trust reposed in the attending physician.

and Section 4 says:

. . . he should not make comments on . . . the practice of the one who preceded him.

Quite correct, and so elementary that the ethically inclined physician does not need to be told this and the unethically inclined will not heed it; but how square these declarations with the following concerning consultations? (Chap. II., Art. III., Sec. 1):

All the physicians interested in the case should be frank and candid with the patient and his family.

If a physician replace a colleague in the care of a patient he should, of course, "observe the strictest caution and reserve" concerning that colleague's diagnosis and treatment, but if, in consultation, the practitioner is found to have made an egregious blunder or if, as also often happens, the consultant himself suggests an asinine diagnosis or treatment, "all the physicians interested in the case should be frank and candid with the patient and his family!" And if the patient, dying or afflicted with an incurable malady, hopefully inquires his prognosis, the physicians "should be frank and candid"—and brutal, else unethical! Of course, all of this doesn't mean any of that; yet, in spite of the fact that this printed primer declares that it is merely expressing in a general way the duties of the physician, it is a precise and proper little primer that seems to have tried to say almost everything that its authors could think of on the subject (not even failing to note that a sick physician might have the benefit of consultants), and it ought to have said what they meant.

Chapter II, Article IV, Sec. 2.—A physician should avoid making social calls on those who are under the professional care of other physicians without the knowledge and consent of the attendant, etc.

"Dr. and Mrs. Optic regret that the principles of medical ethics prevent them from accepting the kind invitation of Mrs. Cervix for dinner on April 1, since the unfortunate absence from the city of Dr. Pessary makes it impossible to secure his knowledge and consent."

Of course, this, too, doesn't mean quite what it says. But why is it said at all? The principle involved was quite fully and clearly expressed in the preceding section:

The physician, in his intercourse with a patient under the care of another physician, should observe the strictest caution and reserve; should give no disingenuous hints relative to the nature and treatment of the

patient's disorder; nor should the course of conduct of the physician, directly or indirectly, tend to diminish the trust reposed in the attending physician.

And one would expect a precise meaning in these published "principles," for the prosy, pernickety—and puerile—pamphlet of twenty-three tiny pages has three and a half pages of index containing one hundred and forty-two entries!

Although there is much that is amusing in the composition of these "principles of ethics," the index is quite the funniest part of it. Who would think of looking in an index for such subject-headings as:

Adequate [service for compensation].

Activity [in public health matters].

Another [physician's patient].

The absurdly numerous cross-references in the index to this tiny publication of twenty-three pages quite outdo the amusing instance of fifteen index entries for the "absurd tale about a cockatoo" in Mivart's "Origin of Human Reason." Here are samples:

Condemning secret division of fees .....	19
Division of fees, secret, condemned.....	19
Secret division of fees condemned.....	19
Delicacy, secrecy and patience .....	3
Patience, delicacy and secrecy .....	3
Secrecy, patience and delicacy .....	3
Charlatans, Public to be warned concerning.....	21
Public to be warned concerning charlatans.....	21
Warn public concerning charlatans.....	21

Neither as a literary product nor as a dignified expression of the lofty principles that, traditionally, govern the ethics of our great profession, is there much to be proud of in this little publication. The revision needs to be revised!

W. M. B.

## THE FUNDS OF THE AMERICAN COLLEGE OF SURGEONS.

On June 22 in Philadelphia, just preceding the meeting of the American Medical Association, the American College of Surgeons will hold its second convocation. Several hundred fellowships will be awarded with interesting, academic ceremony.

When the college was organized a year ago we inquired, in these columns, what is to be done with the huge sum of money that will accumulate from the \$25 initiation fees of the fellows and their \$5 annual dues and, with such a large entrance fee, what is the need of these dues, since the degree (F. A. C. S.) could hardly be, or should not be, revocable for mere delinquency in their payment? We noted that a membership of 5,000 within a few years—a small estimate of eligibles—would represent a fund of \$125,000 in

initiation fees and an annual income therefrom and from dues of \$30,000.

We do not question that these large sums which, as the years go by, will increase to vast proportions, are to be put to good purposes; but we believe it would be quite fitting that, at the coming convocation, the fellows should be told just what those purposes are.—W. M. B.

#### THE WM. T. BULL MEMORIAL.

Now that we are in an inquiring mood, we should like to ask also what has been done with the Wm. T. Bull Memorial fund? This fund was collected five years ago among the lay and professional admirers of the then recently deceased surgeon to provide a Bull Memorial Department of Surgical Research in Columbia University. No accounting of the fund has been made to the contributors nor, so far as we know, has the department been established.—W. M. B.

#### MEETING OF THE AMERICAN MEDICAL EDITORS' ASSOCIATION.

On June 22, at 9 A. M., the above-mentioned association will meet at the Marlborough-Blenheim Hotel, Atlantic City, N. J., under the presidency of Dr. E. A. Van der Veer of Albany, N. Y. An unusually attractive programme is being prepared. Among the papers are the following:

1. President's Address, E. A. Van der Veer, M.D., Albany, N. Y.
2. "Relation of the Medical Press to the Cancer Problem," by Mr. Fred'k L. Hoffman, Statistician of the Prudential Ins. Co., Newark, N. J. (by invitation).
3. "The Things That Count in Medical Practice," by H. Edwin Lewis, M.D., New York.
4. "Ideal National Medical Journal: What It Should Be and What It Should Not Be," by W. J. Robinson, M.D., New York.
5. "Two Problems of the Organization Journal: The Mediocre Paper and the Editorial Department," by Sarah M. Hobson, M.D., Chicago, Ill.
6. "Medical Journalism as a Local and as a National Proposition," by Thomas S. Blair, M.D., Harrisburg, Pa.
7. "Medical Books and Journals," by T. D. Crothers, M.D., Hartford, Conn.
8. "The Medical Periodical and the Scientific Society," by F. H. Garrison, M.D., Washington, D. C.
9. "Editorial Experiences," by A. L. Benedict, M.D., Buffalo, N. Y.
10. "The Special Medical Journal," by A. Bassler, M.D., New York.
11. "The Medical Profession and Its Influence from

a Buying Standpoint," by Joseph MacDonald, Jr., M.D., New York.

12. "The Preparation of the Original Article and the Editors' Latitude," by E. Franklin Smith, M.D., New York.
13. "Medical Publicity in the Lay Press," by Chas. E. Woodruff, M.D., New York, Lieut. Col., retired, U.S.A.
14. "He, Who Is Without Sin Among You, Let Him First Cast a Stone," by E. Reissman, M.D., Newark, N. J.

### Surgical Suggestions

The abduction treatment, so useful in many types of "stiff and painful shoulder," is not conveniently carried out in an abduction splint, as recommended. The wearing of such an apparatus, not regulable from hour to hour, would necessarily confine the patient to his home. It is much better, therefore, to put him to bed or, in mild cases, on a lounge, and abduct the arm on pillows, with or without a sling running from the wrist to the head of the bed, elevation of which, by causing the body to slide down unconsciously, increases the abduction. This method of abduction is not only convenient, comfortable and easy of application, but also has the advantages of being easily regulated and, if necessary, discontinued occasionally to relieve pain or fatigue.

The ideal method of cholecystectomy is to: drag the gall-bladder and, with it, part of the liver as far as possible out of the wound, with a clamp; split the serosa through the middle of the under surface of the gall-bladder down to or on the cysticus; peel back these peritoneal flaps; ligate the exposed cystic bloodvessels on the cysticus, thus obviating bleeding; clamp off and amputate the gall-bladder; investigate and treat the hepatic and common ducts; suture the peritoneal flaps over the gall-bladder bed; insert tube drain down to or into the cysticus, according as it does or does not appear desirable to ligate the duct. This procedure makes the operation practically bloodless and easily controllable, obviates oozing from a raw liver surface and the introduction of gauze packing to control it, and shortens the period of healing. To be sure, this ideal method is not always applicable, as in gangrenous gall-bladders, especially in obese subjects.

## Surgical Sociology

Ira S. Wile, M. D., Department Editor.

### ANIMAL EXPERIMENTATION.

The Bureau for the Protection of Medical Research of the American Medical Association is desirous of obviating as completely as possible any cause for criticism against animal experimentation as well as criticism of new methods in medical practice.

Inasmuch as a good deal of the "evidence" used by anti-vivisectionists or other hostile critics is taken from articles published in medical journals, it is timely that the American Medical Association should endeavor to unite medical editors in a general plan to more carefully edit articles submitted for publication so as to secure the elimination of words, clauses, or sentences which might be misinterpreted or which serve to disguise the actual methods pursued.

At the present time, part of the general intellectual unrest is evidenced in dissatisfaction with things as they are. The majority of the public is not familiar with the aims, the methods, or the significance of medical research. They fail to appreciate its social significance or social value. Unaware of the tremendous advances in public health, and unknowing of the personal benefits they have achieved through animal experimentation, they are easily led astray by the sentimental, mawkish, emotional, and inaccurate statements which emanate from the minds of those peculiar persons who estimate world values in terms of mice and guinea-pigs.

It is timely that the medical fraternity should arise, not to its own defense, but to the defense of the public against the anti-social, malevolent strictures which hysterical agitators desire to place upon measures designed to lessen the burdens of humanity and to safeguard the present and future generations. If health is a purchasable commodity, part of the cost is paid in terms of life, but it is far better for the community that the lives expended should be those of pigs, rats, guinea-pigs, and monkeys rather than human beings.

Ruthless destruction of animate beings is never to be encouraged. Wanton wastage of domestic animals is not to be condoned, nor indeed does the medical profession aid or abet heartless, unsympathetic vivisection of the pure joy of rending defenseless creatures lifeless. Surely humanity does far more vivisection in hunting, fishing, hawking, dog-fighting, or bull-fighting in a single month than could be laid to the doors of animal experimentation since the first experiment on Adam. If one contemplates the sacrifice of animals for personal adornment, covering or food, the horrible effects of all the animal experimentation practiced with the authority of the medical profession fade into insignificance. It is needless to recount the gains in health, the elimination of disease, and the conservation of human beings which has been made possible

through rational, systematic, scientific, altruistic animal experimentation.

The history of surgery is brighter and its development more rapid because of the sincerity and high-mindedness of the research workers who have indulged in animal experimentation. The world is richer for their being and for their work. The "martyrdom" of a few animals has caused deterioration save apparently in the minds of that group of individuals whom Dr. Dana has characterized as suffering from zoophilic diathesis.

### HOSPITALS FOR COMMUNICABLE DISEASES.

In the Public Health Bulletin No. 62 issued by the United States Public Health Service dealing with Communicable Diseases, one finds a splendid compilation of material analyzing the laws and regulations for the control thereof in force in the United States. The basis of preventive medicine is elimination of contagion, the segregation or cure of contagion-bearers, and the sanitary improvement of environment so as to lessen the possibility of the distribution of communicable disease.

At the present time, state health laws largely represent an attempt to control communicable diseases originating beyond the borders of the state. Modern theories of disease causation have not fully penetrated the legislatures. Quarantine, disinfection, and fumigation have been given unusual attention, owing to the earlier imperfect ideas with regard to the spread of disease, while insufficient attention has been given to the protection of the public from insects and rodents, the protection of the milk, water and general food supply, and the disposition of excreta.

According to this Bulletin, it may be conservatively estimated that at least 25 per cent. of the deaths in this country have for their direct or immediate cause communicable diseases. This must, of course, be regarded merely as an estimation as there are insufficient available data for an exact determination, even for the registration area. Accepting this ratio, over three hundred thousand deaths occur annually from communicable diseases. The morbidity rate is a matter of conjecture, but probably over three million cases of communicable disease, which are preventable, occur yearly within the United States.

In order to cope with this tremendous amount of sickness along preventive lines, it is essential to have efficient federal, state and local health organization with thorough coöperation among them, backed up by modern laws and regulations and particularly by the education of the public to the importance of supplying sufficient funds to secure the enforcement of such laws.

The establishment of hospitals for communicable diseases is demanded by law in very few states. In Massachusetts, cities and towns are empowered, and on the request of the State Board of Health compelled, "to establish and constantly maintain within their limits one or more hospitals for the reception of persons having smallpox, diphtheria,

scarlet fever, tuberculosis, or other diseases dangerous to the public health, or to make arrangements with neighboring communities for establishing such hospitals."

In the majority of the states, power to establish and maintain hospitals for communicable diseases is permissive to counties, townships, and cities with great variation, dependent upon the point of view of the legislators in the various states and upon the degree of congestion existent in various portions of the state.

In Alabama, a portion of the state health appropriation must be employed for the maintenance of a field hospital for communicable diseases.

In Arizona, North Dakota, Ohio, Oregon, and South Dakota, local boards of health are authorized to provide temporary places for the care of persons with communicable diseases. In Oregon, the regulations of the State Board of Health advise municipalities with a thousand inhabitants to securing cottages to properly segregate persons afflicted with contagious diseases.

The general attitude towards hospitals has been rather the individual benefits which accrue to the patients. The large social significance of hospitals as institutions for the protection of the community is slowly being disseminated throughout the country. At the present time, there is a large diversity of institutions maintained for specific purposes at an immense cost. It would be possible to unite many of these institutions in such a way as to eliminate the duplication of effort without increasing the overhead charges. There is an unfortunate tendency to the duplication of institutions of the same order which tend to impoverish a community rather than enrich it or secure greater efficiency in administration.

Under modern sanitary régime, it would be rational to combine many existing institutions to the advantage of both the patients and the community.

Greater efforts should be given to the establishment of large general hospitals with general outpatient departments capable of giving such medical, surgical, and social care as would relieve the beds of the hospital for the acute cases where hospital care is imperative.

There is an inadequacy of hospital care for the communicable diseases, particularly for whooping cough, measles, scarlet fever, and erysipelas. While there might be some objections to having wards of a general hospital given over to the care of these conditions, there does not seem to be sufficient grounds for divorcing such diseases from the plan and scope of a well-organized modern sanitary hospital. The complications which attend these conditions frequently require surgical intervention and the facilities for such operative care have been overlooked almost entirely in the planning of institutions for the care of these diseases.

#### HOSPITAL RESEARCHES.

In the advances of all sciences, wave follows wave and there are periods of crest and depth which serve to indicate the measurable progress. Inspiration and aspiration call forth ambition, edu-

cation, and research. In the domain of medicine, a new era has arisen. The standards of the past, rooted in antiquity and tradition, are being revised in the light of modern needs. The desire for facts, scientific and basic, has given rise to a period of marked development. Under the goad of educational ideals, a reorganization is slowly making itself manifest. The dependence of good medicine upon educational advances is more evident than ever before and its recognition is leading to an intelligent conception of the new fields of medical thought.

The discoveries of Koch and Pasteur developed bacteriology. The investigations of Wright, Ehrlich and Wassermann have revised our theories of immunity. The studies of Funk, Chamberlain and Vedder have given us new theories of food values. The careful work of Carrel, Roentgen, Curie, Lane, Murphy, Crile, Welch, Meltzer, Starling, Loeb, Trudeau, and numerous other students with vision have yielded to the community worthy dividends beyond compare.

Research is fundamental to progress, and research is based upon thoughtful analysis and medical imagination. The hospitals will have a unique place in the medicine of the future. The spirit of the laboratory in its highest sense must permeate our wards and the clinical atmosphere of the wards must unite with that of the laboratory. The educational function of the hospital must be evidenced in progressive, united and purposeful research.

## Book Reviews

**A System of Surgery.** Edited by C. C. CHOYCE, B.Sc., M.D., F.R.C.S., Dean of, and Teacher of Operative Surgery in, the London School of Clinical Medicine (Post-Graduate); (Dreadnought) Surgeon to the Seamen's Hospital, Greenwich; Surgeon to the Great Northern Central Hospital. Pathological Editor, J. MARTIN BEATTIE, M.A., M.D., C.M., Professor of Bacteriology in the University of Liverpool; Hon. Pathologist to the Sheffield Royal Infirmary and Royal Hospital. In three large octavo volumes of about 1,000 pages each. *Volume III.* 901 pages; 34 plates in black and in color, and 342 text illustrations. New York: FUNK AND WAGNALLS Co., 1912. Cloth, the set, \$21.00, net.

The greater part of two years has elapsed since the first two volumes of this excellent system appeared. Those of our readers who are familiar with Volumes I and II will require no extended review of Volume III, and those unfamiliar with them will best be served by a repetition of the general impression of the work expressed in the earlier review (the JOURNAL, February, 1913, page 75):

"Although it is composed of individual monographs by about 50 English authors, it is far more acceptable than the usually rather disjointed and uneven 'system.' It also differs much from the common type of English medical works in that it has gotten away from the insularity that usually characterizes them. Indeed, this system appears English chiefly in its authorship. In text and bibliography it quite recognizes that surgery is a mosaic of international workmanship.

"We are pleased also with the prominence given to the pathology of the various diseases considered, and to their differential diagnosis. Operative measures are also re-



ferred to and indicated or described, but details of technic are left for works on operative surgery, where they belong."

In Volume III we again find chief emphasis on pathology and clinical manifestations, without, however, neglect of treatment. It deals with The Cardio-vascular System, by E. Rock Carling; The Lymphatic System, by J. F. Dobson; The Neck, by Arthur Edmonds; The Ear and the Upper Air Passages, by J. Stoddart Barr and Harold Barwell; Direct Examination of the Lower Passages and Esophagus, by St. Clair Thomson; the Lungs and Pleura, by H. Morriston Davies; The Nerves, by James Sherren; The Scalp, Skull and Brain, and The Spine and Cord, by Wilfred Trotter; The Jaw, by D. C. L. Fitzwilliams; The Skin and Subcutaneous Tissues, The Muscles, Fasciæ and Tendons, and The Bursæ, by T. P. Legg, E. Rack Carling, and E. D. Telford, respectively; The Bones and Joints, by C. C. Choyce and Albert J. Walton; and Orthopedic Surgery, by R. P. Rowlands. These sections are all of a high order of excellence. Each is supplemented with bibliographies. There is a general as well as a volume index. An authors' index might well have been added.

**An Introduction to the History of Medicine, with Medical Chronology Bibliographic Data and Test Questions.** By FIELDING H. GARRISON, A.B., M.D., Principal Assistant Librarian, Surgeon General's Office, Washington, D. C. Octavo; 763 pages; illustrated. Philadelphia and London: W. B. SAUNDERS COMPANY, 1913.

It has been a rare privilege to peruse this book. Only once in a long while is given to the reviewer the pleasure of making a "discovery"; this sensation the reviewer acknowledges in the present instance. American literature has long been conspicuous for its lack of a good general history of medicine. A number of attempts have been made, but none has met with approval. Garrison's "History," we predict, will not only lift this opprobrium from our literature, but it will take its place among the best shorter histories of medicine extant.

While modestly entitled "An Introduction to Medicine," the work is so only in a narrow sense. A complete history of medicine must obviously be encyclopedic in dimensions, but there probably never will be a demand for such a work. What the student or the average physician demands is an adequate survey of the progress of medicine, with brief accounts of the lives and labors of the most important contributors to this progress.

Assuming even that an author is equipped with sufficient talent and scholarship, the writing of a satisfying history of medicine is an extremely difficult task. In the first place, medicine has not progressed along one steady path; that progress has aptly been called a series of mighty epics. Furthermore, medicine is so cognate with most of the other sciences that it is difficult to discover where it ends and the special science begins, or vice versa. Then, the progress of medicine can also be described, as Lowell termed the French revolution, as a series of biographies. No modern historian, we venture to say, would think of writing a history of medicine on a purely biographical plan, but a history would lose much of its interest if biography were entirely eliminated. On the other hand, medicine, we are proud to say, is an art as well as a science and a respectable as well as a fascinating history could be written of the methods of medical practice alone, from the days of Aesculapius to the present. Finally, no branch of human knowledge is so indissolubly connected with life itself in all its various phases and it is no presumption to say that a history of medicine is in a sense a history of humanity itself.

A good history of medicine must combine in suitable proportions all these various phases. It is manifest therefore that scholarship of a high order is required to weave the vast material into a satisfactory pattern. We cannot think of a training more stimulating to the cultivation of such a scholarship than that of a position as the principal assistant in the Surgeon General's library. In this sphere one is brought into constant contact with every phase of medical activity, past and present. When, in addition

to such a training, we find a keen critique, distinctive literary ability, and a fine sense for characterization, we perceive that the author is unusually equipped as a medical historian.

While at first glance the text appears rather disjointed, closer study reveals a logical plan. Garrison divides the history of medicine into twelve periods: Ancient and Primitive Medicine, Egyptian, Sumerian and Oriental, Greek, Byzantine, Mohammedan and Jewish, Medieval, Renaissance and Reformation and the 17th, 18th, 19th and 20th Centuries. In each period the story of the progress of medicine is told, partly as a continuous narration and partly in biographical form. The biographies fit into the narration perfectly, so that the continuity of the story is not broken. These biographies are models for terseness and proportion of detail. What gives many of them especial charm is their delightful and often humorous characterization. Important discoveries, with their date and author, are usually printed in small letters. Especially interesting are the chapters on the social and cultural aspects of medicine, affixed to each period, from the Mohammedan to the present. In these chapters, the mode of practice characteristic of each period, including fees, is set forth.

The chapter on the social and cultural aspects of modern medicine reveals the catholicism of the author in striking fashion. We find here a broad and critical discussion of such subjects as fees, medical art, education, education of women, hospitals, nursing, care of the insane, hygiene, medical publications, sectarianism and quackery, and internationalism. The appendices include a medical chronology, bibliographic notes for collateral reading, test questions and an index for proper names. There is also a full index of subjects. The illustrations form a singularly delightful feature of the book. All in all, the writer deserves congratulations for having made a book of which American medicine may well be proud.

**Chirurgische Operationslehre.** By AUGUST BIER, Berlin; HEINRICH BRAUN, Zwickau, and HERMANN KUEMMELL, Hamburg. Vol 1, Part II. Leipzig: JOHANN AMBROSIOUS BARTH, 1914. Price, \$6.25.

With the publication of this part of the work, the three volumes of this text-book of operative surgery are now complete. Each section, as it appeared, was reviewed in these columns. This section deals with operations of the head and face, and those of the spine and spinal cord. The same high level of excellence that was evident in the other parts of this operative surgery is to be seen here. There are few chapters towards which adverse criticism can be directed. It is found, however, that the removal of non-circumscribed tumors of the brain is all too briefly and dogmatically presented (page 91). The methods of intracranial approach to the sella turcica are not well described, and recent advances in the field are not mentioned (page 111). The section dealing with operations on the face, by Koenig, Lexer, and Wiede, is the best in this volume; but altogether too much space is devoted to the results of individual plastic operations, and too little to the underlying principles of technic. Laryngectomy, described by Schmieden, is beautifully illustrated by colored plates taken from his book on operative surgery (reviewed in this issue of the JOURNAL). However, the author does not devote much attention to the technic of removal of spinal cord tumors.

The text is clear and well arranged throughout, the numerous illustrations are beautifully executed, the treatment of the subjects admirable. Part II of Volume I takes its place with the others in what will prove to be a standard text-book of operative surgery.

**Der Chirurgische Operationskursus. Ein Handbuch fuer Aerzte und Studierende.** PROF. DR. VICTOR SCHMIEDEN, Professor der Chirurgie, Direktor der Koenigl. Chirurgischen Universitaets-Klinik zu Halle. Third edition. Leipzig: JOHANN AMBROSIOUS BARTH, 1914.

The great value of Schmieden's text-book of operations upon the cadaver we have pointed out in the reviews of the first and second editions of his work.

All that need be added is that the book has been brought completely up to date, the most recent developments in surgical technic having been added.

**The Pathology of Growth Tumors.** By CHARLES POWELL WHITE, M.D., F.R.C.S., Director, Pilkington Cancer Research Fund; Pathologist, Christie Hospital, Manchester; Special Lecturer in Pathology, University of Manchester. Octavo; 235 pages; illustrated. New York: PAUL B. HOEBER, 1913.

This is another book that attempts to discuss an immense subject within unreasonably small limits. In thirteen short chapters (the text is far shorter than appears, owing to abundant illustrations, large type and wide spacing), White attempts to cover the gross and histological features of tumors, besides such large subjects as regeneration, transplantation, the growth, origin, cause, and physiological and biological aspects of tumors. The result is that when one has finished reading the book, he feels that he has merely skimmed the subject. The work may serve a useful purpose as an elementary text book for beginners. It is of no value whatever as a work of reference. As an instance of the inadequacy of the text, we may mention that the entire subject of teratoma is dismissed in about three full pages. The book is written in a didactic manner, without a single reference of any kind. The illustration, nearly all microphotographs, are excellent and well reproduced.

**Modern Surgery, General and Operative.** By JOHN CHALMERS D'ACOSTA, M.D., LL.D.; Samuel D. Gross Professor of Surgery, Jefferson Medical College, Philadelphia, etc., etc. *Seventh edition.* Large octavo; 1,515 pages; 1,085 illustrations, some in colors. Philadelphia and London: W. B. SAUNDERS Co., 1914. Cloth, \$6.00 net.

In reviews of earlier editions we expressed the opinion that this is the best single-volume text-book of surgery in English. Of this edition we cannot say more, and we find no reason to say less.

The book is enlarged by only a dozen pages, but it shows careful revision and a conscientious effort to include all the important new facts in surgery.

**Radium Therapeutics.** By N. S. FINZI, M.B. (Lond.), M.R.C.S., L.R.C.P., L.S.A., Chief Assistant in the X-ray Department, St. Bartholomew's Hospital, London. Duodecimo; 112 pages; illustrated. London: OXFORD UNIVERSITY PRESS, 1913. Price, \$2.00.

This timely little work is a concise description of the various radium rays, radium emanations, and radium decomposition products of the action of radium radiations on the animal tissues, and of the methods of employing radium, uranium, thorium and mesothorium therapeutically. The work is very condensed, dealing with general rules rather than with statistical reports or clinical considerations.

**Medical Gynecology.** By S. WYLLIS BANDLER, M.D., Adjunct Professor of Diseases of Women, New York Post-Graduate Medical School and Hospital. *Third edition.* Octavo; 790 pages; 150 illustrations. Philadelphia and London: W. B. SAUNDERS COMPANY, 1914. Cloth, \$5.00, net.

A valuable feature of this revised edition is the enlarged chapter on disturbances of the glands of internal secretion. While there is much room for a better understanding of this subject, Bandler has appropriately incorporated into his medical gynecology what is known with a certain amount of definiteness concerning the derangements of the organs of internal secretion and their effects upon the genital functions of woman as well as upon her general health. We feel after reading this chapter and

the rest of the book that we have been aided toward a more intelligent consideration of gynecologic disease and its more rational treatment.

**Treatment of Sexual Impotence, and other sexual disorders in men and women.** By WILLIAM J. ROBINSON. Duodecimo; 422 pages. New York: CRITIC AND GUIDE COMPANY, 1913. Price \$3.00.

This book, dealing with mooted and difficult questions, satisfies several very important demands. We have here a legitimate medical consideration of such matters as masturbation, pollutions, spermatorrhea and sexual impotence, which hitherto have been and even at the present time are still relegated largely to the wilful disposition of quacks. It is well to have an authoritative opinion as that given by the author in no uncertain terms about these borderline topics. In addition to Robinson's valuable instructions in diagnosis and these recommendations for appropriate medical and surgical treatment of these sexual disorders, his original literary treatment of the subject and the strong personality infused throughout his text are enough in themselves to insure for this work prompt popularity.

**Chronic Ulcers of the Leg.** By EDWARD ADAMS, M.D., Instructor of Surgery in the New York Post-Graduate School and Hospital; Attending Surgeon to the German Hospital, Out-Patient Department. Duodecimo; 127 pages; illustrated. New York: THE INTERNATIONAL JOURNAL OF SURGERY Co., 1914.

This small book is intended as a résumé of the various methods of treatment of chronic ulcers of the leg, and the results of these methods in the hands of the author. Adams has successfully accomplished his object, and we have, in his work, a desirable summary of the subject presented in a very simple way. Nothing new is offered, but most of the standard methods of treatment are well analyzed. The book should appeal to those who do not wish an exhaustive survey of the diagnosis and treatment of chronic ulcer of the leg.

## Books Received.

**The Clinics of John B. Murphy, M.D.,** at Mercy Hospital, Chicago. Published bi-monthly. *Volume III, Number 1.* Octavo; 190 pages; 91 illustrations. Philadelphia and London: W. B. SAUNDERS COMPANY, 1914. Price per year: Paper, \$8.00. Cloth, \$12.00.

**Radium Therapeutics.** By N. S. FINZI, M.B. (Lond.), M.R.C.S., L.R.C.P., L.S.A., Chief Assistant in the X-Ray Department, St. Bartholomew's Hospital. Octavo; 112 pages; illustrated. London: OXFORD UNIVERSITY PRESS, 1913.

**The Pathogenesis of Salvarsan Fatalities.** By SANITÄTS-RAT DR. WILHELM WECHSELMANN, Directing Physician of the Dermatological Department, Rudolph Virchow Hospital, Berlin. Authorized translation by CLARENCE MARTIN, M.D., St. Louis, Mo. Duodecimo; 143 pages. St. Louis: THE FLEMING-SMITH Co., 1913. Price, \$1.50.

**Surgery; Its Principles and Practice.** For Students and Practitioners. By ASTLEY PASTON COOPER ASH-HURST, A.B., M.D., F.A.C.S., Instructor in Surgery in the University of Pennsylvania; Associate Surgeon to the Episcopal Hospital; Assistant Surgeon to the Philadelphia Orthopedic Hospital and Infirmary for Nervous Diseases. Large octavo; 1141 pages; 7 colored plates and 1,032 illustrations. Philadelphia and New York: LEA AND FEBIGER, 1914. Cloth, \$6.00, net.

# Progress in Surgery

A Résumé of Recent Literature.

**Extirpation of a Tumor of the Pancreas.** (*Extirpation eines Pankreastumor.*) W. KOERTE, Berlin. *Deutsche Medizinische Wochenschrift*, 1914, No. 9.

The patient, a young woman, had been operated upon by another surgeon for intestinal obstruction, and the cystic tumor of the pancreas had been sutured to the abdominal wall and then drained. The fistula never closed, and the surrounding skin was constantly irritated by the discharge. Koerte followed the fistulous tract into the depths and found that it led to a multilocular tumor of the pancreas. The numerous adhesions were divided and the tumor, together with a V-shaped portion of the pancreas, was removed. The defect in the pancreas was sutured, and the wound closed about gauze drains. There was a profuse serous discharge that soon ceased, and the patient is now entirely well.

Macroscopically the tumor was a multilocular cystadenoma. Upon microscopic examination the cyst walls were found lined with a thin layer of epithelium. One region, that of the tumor mass, showed a carcinoma-like structure.

It is pointed out by Koerte that the surgical treatment of cysts of the pancreas depends on their structure. Most of them are pseudo-cysts, of inflammatory or traumatic origin, and the history of these cases clearly points to the nature of the cysts. The correct treatment for them is suture to the abdominal wall and drainage. Such treatment is not curative for the rarer, true cysts (cystadenomata). These grow slowly and give no symptoms until they encroach upon neighboring organs. Drainage does not cure the patient; in fact, Koerte believes that these tumors should be left alone unless they can be excised.

**Cyto-Diagnosis of the Stomach.** LOEPER and BINET. *Archives des Maladies de l'appareil Digestif et de la Nutrition*, April, 1914.

The report is based upon 160 examinations; 21 of the cases were followed to operation or autopsy. The patient is examined after a 12-hour fast. An ordinary stomach tube is gently inserted and the stomach washed by siphonage. There is then introduced 300 cc. of 0.7% salt solution, and within a minute this is allowed to siphon back. This fluid is centrifuged for ten minutes and the sediment smeared on a slide, dried, fixed in alcohol and stained with eosin-hematoxylin.

The authors claim a characteristic picture for each of the gastric diseases.

1. **Normal**—a few pavement cells of the mouth or esophagus, large, rectangular or polygonal, with small, dark nuclei; a small amount of debris. In cases of sialophagy these large cells with small nuclei are very numerous; they are usually covered with bacteria.

2. **Dyspepsia**—the same as above. Cystology here most useful in ruling out an organic lesion.

3. **Gastritis**—Pytologically, four types are recognized:

(a) **Mucous gastritis**—characterized by an abundance of mucus; frequently yeast cells.

(b) **Hypergenetic and Desquamative Gastritis**—very numerous, small, rounded polygonal cells; protoplasm is indistinct, granular, pale eosin color, and frequently escapes from the cell borders. Nuclei are relatively large and deeply stained blue. Differentiation between chief and border cells is impossible.

(c) **Diapedetic Gastritis**—characterized by the large number of leucocytes, polymorphonuclear, eosinophilic and lymphocytic.

(d) **Congestive Gastritis**—Large number of red blood cells are present, besides the leucocytes. The red blood cells are dispersed, and pale, in contrast to the findings in ulcer, in which rouleaux formation and fresh, bright blood cells are seen.

In general, the findings of the authors tend to increase

the number of cases of gastritis at the expense of the dyspepsia cases.

4. **Ulcer**—A few small epithelial cells, many polymorphonuclear cells, and a variable number of red blood cells. Infected ulcers give a larger percentage of leucocytes. The process of healing may be followed by the disappearance of this cystological formula.

5. **Cancer**—Pyloric tumors give cylindrical and elongated cells; those of the fundus and borders, small round and polygonal types. These latter have an indistinct protoplasm, light though large nuclei. The whole cell is smaller in size than a leucocyte.

Cells from colloid carcinomata show vacuolated protoplasm taking strong eosin stains.

Infection of an ulcerating growth is easily identified.

**Hypertrophic Pyloric Stenosis in an Infant; Rammstedt's Operation.** HOWARD LILIENTHAL. New York. *New York Medical Journal*, April 11, 1914.

The mortality after gastro-enterostomy and pyloroplasty for hypertrophic pyloric stenosis in infants is formidable. Rammstedt's operation consists in longitudinal incision through the indurated tissue down to the mucosa without opening it. The wound is left without sutures and the abdomen closed. Rammstedt reports two successful results and now Lilienthal reports another. The infant was five weeks old, showed all the typical symptoms of hypertrophic pyloric stenosis and was fearfully emaciated. Lilienthal operated according to the method above described. The relief of the pyloric constriction immediately after division of the muscular coats was quite noticeable, the gap in the incision being one cm. wide at its broadest part. The operation took only nine minutes including suture of the abdomen. The child improved promptly and at present is normal in weight and appearance.

**Mikulicz's Disease.** CARL FISHER, Rochester, Minn. *The Journal-Lancet*, March 15, 1914.

A typical case of this unusual disease is described. It occurred in a male, aged 47 years, and when seen by Fisher had been present for five years. It began with swellings under the lower jaw, followed by enlargements of the lachrymal glands and then the axillary lymph-nodes. As shown by the illustration, the tumors had reached an enormous size. X-ray examination showed involvement of the mediastinal nodes. The blood examination, except for a slight increase in polynuclear leucocytes and an anemia, was normal. Specimens were excised from the submaxillary region and from the lachrymal gland. These showed masses of lymphoid cells of rather large size.

The author in a brief discussion is inclined to place the disease in the same class as Hodgkin's disease—it is a clinical type of apparently the same pathological process and is evidently closely related to lymphomata and to the leukemias.

**Cholecystitis and the Factors that Control Results of Operation.** C. H. MAYO, Rochester, Minn. *The Journal-Lancet*, April 1, 1914.

Mayo emphasizes the fact that gastric symptoms are very often reflex, taking their origin in disease of the gall-bladder. Such disease, however, is often difficult to detect, even when the abdomen is opened, for the external surface of the gall-bladder may appear normal and adhesions may be absent. In such cases Mayo believes that the lymph-nodes extending along the common and hepatic ducts and one or two situated near the cystic duct may be of great use in giving the surgeon the needed information. When these glands, which may best be palpated with one's finger through the foramen of Winslow, become enlarged, it means that there is disease in the duodenum, the pancreas or the gall-bladder. When a definite source of infection is known, the treatment of mild cases of cholecystitis may be medical; but for the same cases, when found surgically, prolonged drainage should rarely be instituted rather than the removal of the gall-bladder.

**The Chemistry of the Duodenum; Its Comparative Value with the Indirect Methods of Testing Pancreatic Function.** GLATZ. *Archives des Maladies de l'appareil Digestif et de la Nutrition*, March, 1914, page 121.

The methods of examination of duodenal contents are the accepted ones; the Einhorn Duodenal Tube is used; milk is employed as a test meal, and to carry with it, the tube into the duodenum. The chemical methods used are grossly qualitative, and no attempt at quantitative estimation of pancreatic activity is made. The stool is examined for trypsin by means of Schlecht-Müller plates of serum; the Sahli and Schmidt tests are also employed, as well as the adrenalin test of Lödi. The results were as follows:

**Normal**—10 cases—Bile and pancreatic ferments present in all cases. Glutoid capsule test of Sahli, positive 6, negative 3; serum plates, positive 8, negative 1; Schmidt nuclear test, positive 4, negative 5.

The reliability of the duodenal test and the unreliability of the other tests is easily noted.

**Diseases of the gastro-intestinal tract**—Including functional disturbances, gastric ulcers and carcinomata, and alcoholic liver cirrhosis. Twenty cases—bile and pancreatic ferments constantly present in all. Sahli glutoid test, positive 13 times, negative 5 times. Serum plates, positive 19 times, negative once.

#### PANCREATIC DISEASES.

1. **Cancer of Stomach and Pancreas**—Duodenal contents—bile present. Pancreatic ferments negative. Stool ferment tests and adrenalin eye tests all negative.

2. **Cancer of Head of Pancreas** (confirmed at autopsy)—Pancreatic ferments absent. Bile not mentioned. Stool ferment tests, adrenalin eye tests negative.

The paper is valuable as showing in a large series of normal cases, and of gastro-intestinal diseases, the constant presence of bile and pancreatic ferments in duodenal contents and the irregular results with other tests. The Schlecht-Müller plates are more reliable than the others. In two cases of pancreatic carcinoma the pancreatic duct was found obstructed.

**Cholecystitis Without Stones or Jaundice in Its Relation to Chronic Pancreatitis.** W. J. MAYO, Rochester, Minn. *American Journal of Medical Sciences*, April, 1914.

Mayo calls attention to cases of chronic pancreatitis not associated with jaundice, in which at operation the gall-bladder is found undistended and free from stones, yet is nevertheless the seat of a chronic cholecystitis. The inflammation is characterized by the so-called "strawberry" appearance of the mucosa of the gall-bladder. The important point is that these patients are not cured by mere drainage of the gall-bladder. They are free of symptoms as long as the drainage persists; as soon as the opening closes the symptoms recur. For such cases cholecystectomy is the justifiable procedure.

**A Method for Plicating Voluminous Ceca.** JOSEPH A. BLAKE and J. N. WORCESTER, New York. *Medical Record*, April 4, 1914.

The authors' method is applicable to cases of large dilated ceca which give rise to a rather definite symptom-complex. The major symptom is pain in the lower right quadrant occurring in ill-defined attacks. In addition there is abdominal distension with gas, constipation and symptoms of intestinal auto-intoxication and gastric symptoms. X-ray examination shows the cecum low in the true pelvis, and poor emptying of its contents. At operation, the cecum is usually found mobile with a good mesentery, but the organ is unusually large and has thin walls. The authors do not believe the mobility has anything to do with the symptoms; rather these are due to lack of mobility and contractility. Blake's operation consists in passing a continuous silk or linen suture between the external and middle longitudinal bands; the stitch is carried aborally as far as is practicable, usually ten to fifteen cm., so that when tied the gut is contracted longitudinally as

well as transversely. In all cases the appendix is removed. The authors' analysis of their results in fourteen cases prove that the operation is of profound benefit.

**A Case of Transgastric Excision of a Gastro-Jejunal Ulcer.** B. G. A. MOYNIHAN and E. T. TATLOW, Leeds. *Lancet*, March 14, 1914.

This rather unusual case was ingeniously handled. Two years after a gastro-enterostomy was performed for duodenal ulcer there was recurrence of symptoms. At the second operation an indurated gastro-jejunal ulcer was found on the posterior opening of the gastro-enterostomy, which was patent and otherwise in good condition. An opening into the anterior wall of the stomach was thereupon made, the ulcer averted into the incision and excised. A temporary gastrostomy was also done. The patient made a perfect recovery.

**Contribution to the Treatment of Duodenal Fistula.** C. A. PANNETT, London, *Lancet*, April 18, 1914.

Sutures of a duodenal perforation resulted in a formation of a fistula. Four days later the condition of the patient was desperate. As a last resort, Pannett opened the abdomen, made a side-to-side anastomosis in the first foot of jejunum and then made a jejunostomy in the efferent loop. Food was given through this tube and through the mouth. The fistula immediately began to close and the patient made a perfect recovery. Pannett compares the advantages and disadvantages of this procedure with others that have been recommended for duodenal fistula—especially with the operation of Berg (gastroenterostomy with occlusion of the pylorus). He believes that his method will prove the method of choice.

**Radium Treatment of Carcinoma of the Uterus.** (*Zur Radiumbehandlung der Uteruskarzinome.*) R. KÖHLER and O. SCHINDLER, Vienna, *Wiener Klinische Wochenschrift*, April 9, 1914.

The authors report very favorable results in seven cases of epithelioma of the cervix, six of which were inoperable. A tube containing 29 mg. of radium bromide, enclosed in a platinum and lead shell was inserted into the tumor, through either a sloughing fistula or an artificial opening. A preliminary microscopic examination was made in every case. In every case, the patient thus far is free from tumor, not only clinically, but microscopically. In one case, a recto-vaginal fistula resulted from an extensive radium burn.

**A Plea for Early Operation in Case of Uterine Fibroids.** A. E. GILES, London. *The Medical Press*, February 18, 1914.

In an analysis of 580 cases of uterine fibroids, the author brings out a number of interesting points. He believes that gynecologists are too prone to put off operating on apparently simple cases of fibroids and that they should be taken over by the surgeon early for the following reasons: The age incidence of fibroid is so varied that no importance can be attached to age as an indication for operation. Early operation would often allow of a conservative myomectomy, when delayed operation necessitates hysterectomy. In a large proportion of cases fibroid tumors are associated with pathological complications, many of which are of a dangerous nature. Diagnosis is still so uncertain that grave conditions urgently requiring operation may be mistaken for simple fibroids. The mortality attendant on the procedures of myomectomy and hysterectomy in the practice of experienced surgeons has become so reduced that operation may legitimately be advised for the relief of suffering when life is not directly threatened. Early operation prevents the health and life of patients from being sacrificed to the exploded fallacy of "waiting for the change of life."

**The Treatment of Carcinoma Uteri by Radio-active Substances.** (*Zur Behandlung des Carcinoma Uteri mittels Radiaktiver Substanzen.*) L. LANDAU, Berlin. *Zentralblatt für Gynäkologie*, March 14, 1914.

Landau favors radical extirpation of the operable carcinomatous uterus because there may be metastasis in the

fundus which, at a minimum depth of four centimeters, is not accessible to the radium rays or but little so. The thickened uterus, further, acts as a distinct filter to the rays. In the vaginal radical operation, the necrosis of the parametria—as much as two centimeters at times—and the suture of the stumps into the vagina, opens up wider fields of tissue for the subsequent application of the radium or other radio-active substances.

#### On the Etiology and Bacteriology of Leucorrhœa.

ARTHUR H. CURTIS, Chicago *Surgery, Gynecology and Obstetrics*, March, 1914.

Curtis reiterates that lacerations and displacements, cervical changes which cause increased mucous secretion, infections complicating pregnancy and gonorrhœa, cause leucorrhœal discharge. From his bacteriological studies he concludes that the uterine cavity tends to remain free from bacteria in cases of leucorrhœal infection, although mucous secretion from the cervix may promote the development of purulent discharge; the lower genital tract is the usual seat of the formation of purulent discharges, however. The development of chronic leucorrhœa in unmarried women is usually preceded by infection with gonorrhœa, the gonococcus preparing the soil for other organisms. The majority of the bacteria producing leucorrhœa are anaerobes, Gram-negative bacilli predominating. The colon bacillus and the staphylococcus seem to be of secondary importance.

#### Attempts to Reduce the Time of Cure of Fibroids by Increase in the Dosage of the Roentgen Rays. (Ueber Versuche, die Heilungsdauer bei der Myombehandlung durch Steigerung der verabreichten Roentgen mengen noch weiter Abzukürzen.) ERWIN VON GRAFF, Vienna. *Zentralblatt fuer Gynäkologie*, March 14, 1914.

Von Graff concludes from his experience in ten cases that an increased therapeutic effect may be expected by an increase in the portals of treatment—such as by employing the vagina—and by simultaneously diminishing the number of applications, although the dosage of the Roentgen rays shall remain high. The ideal result would be obtained by distributing the rays over eight to ten fields of exposure in such dosage that ten to twenty X would continue their effects to a depth of from six to eight centimeters, the average depth of the ovaries from the surface.

#### Two Cases of Tearing Away of the Uterus after Vaginifixation. (Zwei Fälle von Abreissung der Vaginifixierten Uterus von der Anheftungsstelle.) J. VOIGT, GÖTTINGEN. *Zentralblatt f. Gynäkologie*, February 21, 1914.

Two patients upon whom a vaginal fixation had been performed for cystocele and for prolapsus uteri respectively, reported, one after two years, the other after a year and a half, sudden sharp pain in the abdomen. In both the uterus was found in retroflexion, and a thinning of the vagina, like a hernial opening, was detected in each instance. In the first case the accident followed working, in the second a fall.

#### A Case of Remarkable Fertility (Combined with Constant Bleeding in the Non-Pregnant Period). (Ein Fall von Besonderer Fertilität [kombiniert mit Konstanten Blutungen in der Schwangerschaftsfreien Zeit].) BRUNO BERGER, Wieden. *Zentralblatt f. Gynäkologie*, March 7, 1914.

Berger reports the case of a woman who in twenty-five years of married life had thirty pregnancies with thirty-six fetuses. Twenty of the children lived. There were four sets of twins and one of triplets. She first menstruated at ten years of age and up to her marriage at twenty bled constantly. In the few intervals between her pregnancies, she also bled continuously. Berger regards the case as one of unusual richness in Graafian follicles and as an instance, as well, of continuous ovulation. The patient was herself one of twins.

#### Spontaneous Supravaginal Amputation of a Myomatous Uterus Caused by Twisting on Its Axis. (Supravaginale Selbstamputation eines durch ein Myom um seine Achse gedrehten Uterus.) L. RUPPERT, Vienna. *Wiener Klinische Wochenschrift*, March 12, 1914.

This remarkable case appears to be unique in medical literature. A woman 72 years of age was admitted to the hospital with symptoms of intestinal obstruction. For a year the patient had suffered from abdominal cramps, accompanied by slow increase in the size of the abdomen. During the week before admission these cramps became intense, and were accompanied by fainting spells. At operation a large myomatous uterus was found completely separated from the cervix except for a narrow strip of serosa. The uterus showed three twists from left to right and was attached merely by the broad ligaments. The abdomen contained some fresh and old blood. After hysterectomy the patient made a perfect cure.

#### Treatment of Fibroids by Deep Roentgentherapy. J. J. LEVY, Syracuse. *New York State Journal of Medicine*, April, 1914.

Levy comments upon the brilliant results obtained by Krönig and Gauss in the treatment of fibroid tumors of the uterus by x-ray. He states that 75 per cent can be cured by this method. The essential points in the treatment are: 1. Massive doses. 2. The use of a very hard tube, so that the more penetrating rays can be employed. 3. The tube must be near the part to be treated. 4. The use of a thick filter (aluminum) so that the soft rays which injure the skin can be excluded. 5. Cross-fire technique. This means that the rays are allowed to penetrate the abdomen at a different site at each sitting. The dose is regulated by means of the Sabouraud pastille and the Kienbock quantimeter. The rays cure by causing atrophy of the ovaries and in consequence premature menopause. The older the patient the shorter the period of treatment. The method is not indicated in pedunculated fibroids or those undergoing malignant degeneration. Finally, the method is perfectly safe.

#### Free Transplantation of Bone Into the Phalanges. S. L. HAAS, San Francisco. *Journal American Medical Association*, April 11, 1914.

The treatment of acute and chronic osteomyelitis of the phalanges by bone transplant and the methods that have been employed or suggested are taken up by Haas, who reproduces in brief the accounts of previously reported cases and two of his own. In each of these a transplant from the tibia with its periosteum attached was used after removal of the diseased bone with the necessary amount of the healthy bone and the involved tendon sheaths. In one case while the cosmetic result was good, owing to the limited amount of flexion, a good functional result was not obtained. In the second case, apart from a slight bend the finger appears almost normal and flexion and extension are nearly perfect. One of the most striking facts is the inactive part that the transplant seems to take in the regeneration as compared with the remaining portion of the preëxisting periosteum. As regards the preferable method, he thinks the removal of the whole phalanx and substitution of another is much more formidable than a partial resection. The question of the transplant ability of the epiphysis arises, but if it should be destroyed, it might be advisable to try a whole phalangeal transplantation, especially in case of tumors showing evidences of malignancy.

#### The Treatment of Acute Osteomyelitis of the Long Bones by Means of the Dental Engine and a Large Burr. F. G. DYAS, Chicago. *Journal American Medical Association*, April 18, 1914.

Dyas criticizes the usual method of treating osteomyelitis of the long bones by means of the mallet and chisel. They cause unnecessary traumatism, he says, and the attainment of sterilization is often impracticable even by the most skilled. The methods of the dentist in the treatment of jaw troubles are much better as regards the sterilization and the attainment of absolute asepsis in badly

decayed and infected teeth is a matter of every-day occurrence to the dentist. With this idea in mind he has treated a series of cases of osteomyelitis by exposing the diseased tissue, painting with a solution of one part glycerin, and two parts iodine before making the incisions, and then using a large burr driven by a dental engine until it has removed every suspicion of decayed bone and left a smooth surface instead of the ragged edges left by the chisel and mallet. The operator readily acquires the ability to tell when the burr is working in diseased or normal bone by the greater resistance offered by the latter. With the burr he can safely operate where with the chisel and mallet it would be dangerous, and the chance of the heat and friction generated by the burr destroying the microbes is to be considered. It has been shown by cultures made from the inner surface of machinery belts that mechanical influence may produce an effective bactericidal action. One case is reported showing the success of this method, and, as the article is offered as a preliminary report, the publication of further data seems probable.

**"Tango" Foot.** G. F. BOEHME, JR., New York. *Medical Record*, April 25, 1914.

Boehme has seen seven cases of a rather typical syndrome, which in every case could be ascribed to dancing, according to the modern style. The patient complains of pain in the outer anterior aspect of the leg at its lower third. Stiffness in extension and flexion of the foot becomes marked and the patient limps; over the region of the tibialis anticus tendon pressure causes slight tenderness; at this region, the typical crackling feeling of a tenosynovitis is noticed. Boehme regards the tenosynovitis as due to the excessive flexion and extension movements at the ankle necessitated by the modern forms of dancing. Treatment consists in rest, massage and counter-irritation.

**Bone Transplantation for Defects in the Long Bones.** (*Beitrag zur Knochentransplantation in Defekte von Röhrenknochen*). DR. KORENCAN, Vienna, *Wiener Klinische Wochenschrift*, March 19, 1914.

The author comes to some interesting conclusions from the observations of one case. About a quarter of the lower end of the femur in a boy nine years of age was resected for a small sarcoma of the bone. A piece of fibula covered by periosteum was inserted into the defect. Primary union was obtained, but a few weeks after the operation a fistula formed, discharging sero-purulent fluid. This persisting, the wound was reopened, and the transplanted piece of fibula, denuded entirely of its periosteum and partly necrotic, was removed. Despite this, the X-ray picture made four years later shows perfect continuity of the femur, with slight shortening of the lower extremity. The author concludes that the transplanted fibula served its function through the periosteum which it left behind. Korencan believes that the periosteum is the important element in restoring the continuity of a bone defect, and that it should be saved when possible in the course of bone resections. If this is not possible, the procedure carried out in this case should be attempted.

**Epicondylitis (Franke) or Tennis Elbow.** W. P. COUES, Boston. *Boston Medical and Surgical Journal*, March 26, 1914.

This injury most often occurs in tennis players, but may occur after any strenuous exercise involving the arm or even manual labor. There is pain in the elbow, accompanied by tenderness over the external condyle. The pain may be very severe, so that movement of the elbow is very painful, or the arm may seem paralyzed. The pain is increased by extension; may be intermittent or constant, and returns when the exercise is taken up again. After a period of weeks or months, with or without treatment, the pain and tenderness disappear. The cause of the trouble has not been cleared up, but the author suggests two possibilities: 1. "Tearing of some of the muscular attachments from the external epicondyle, giving rise to the separation of bony spicules." This was demonstrated in two of the three cases reported by the author. 2. "Injury to the radio-humeral joint capsule from antagonistic muscular

contraction of the supinator brevis and supinator longus (Preiser)." Heat and fixation appear to be the best methods of treatment.

**A Case of Extensive Replacement of Tendons by Means of Free Fascial Implantation.** (*Ein Fall von Ausgedehnten Sehnenersatz durch frei Faszientransplantation*.) J. GOBIET, Orlau. *Wiener Klinische Wochenschrift*, February 26, 1914.

Following an infected injury of the dorsum of the hand, all the extensor tendons of the hand, with the exception of the thumb, became completely necrosed and sloughed away. When the wound had completely healed, the dorsum of the hand was exposed by a large flap and defects in the tendons were found varying three to five cm. in length. Four broad strips were prepared from the fascia lata of the thigh. These were then sewed between the divided ends of the tendons in such a manner that the ends were rolled around the ends of the tendon while the intervening portions were made into a canal. Fine silk sutures were used. Despite some infection, the functional result was excellent.

**Indications for Intestinal Resection in the Radical Cure of Certain Herniae.** (*Dans Indications de la Resection Intestinale dans la Cure Radicale de Certaines Hernies*.) E. QUÉNU and H. CONSTANTINI, Paris. *Revue de Chirurgie*, April 10, 1914.

When strangulation or gangrene of intestine exists, the indications for the treatment of the bowel are fairly well defined. The authors, however, find that the treatment of the intestinal contents not strangulated but otherwise diseased has not been sufficiently considered. They have collected a number of these cases, and include their own as well. They find that resection may be indicated:

1. In some unusual instances of herniae containing tumors of the intestine.
2. In rare cases of localized tuberculosis of the intestine in the sac.
3. In adherent herniae when (a) the intestinal wall is considerably damaged in freeing it; (b) extensive avulsion of the serosa is the result of operative manipulations; (c) the intestine, freed from adhesions, is found covered with extensive scar tissue; (d) several loops of gut are found very intimately adherent to one another.
4. No definite conclusion for the treatment of intestine that is found in enormous herniae, and has no place in the abdominal cavity, has as yet been reached by the authors.

**Profuse Hemorrhage in Tuberculosis of the Kidney; The Use of Adrenalin Injections as an Adjuvant to Treatment.** R. P. CAMPBELL, Montreal. *The American Journal of Urology, Venereal and Sexual Diseases*, April, 1914.

Two cases of tuberculosis of the kidney are reported in which the hemorrhage was so profuse that the bleeding of renal tumor, or hemophilia, or "essential hematuria," was simulated. The first case was operated upon for "essential hematuria" after the cystoscopic examination showed that blood was spurting from one ureteric orifice and that there were no signs indicating tuberculosis; it was only when the capsule of the kidney was stripped preparatory to fixation that a small tuberculous focus was found. In the second case the very active bleeding was very well controlled by repeatedly washing out the renal pelvis with 1-3,000 adrenalin solutions.

**Spinal Transplant.** H. B. THOMAS, Chicago. *Journal American Medical Association*, April 4, 1914.

Thomas says that the non-operative treatment of tuberculous vertebrae is usually satisfactory when it can be continued over a long period of time. It is, however, impossible to control some cases so as to give rise to a firm ankylosis, and he illustrates these types by case-reports in one of which a transplant from the tibia is used. He asks, if this last case is not thus a better risk than if treated by long recumbency and braces. A shortened period of treatment is also a matter of consideration. The facts that should be considered in cases for operation are given as follows: "1. The general vitality of the patient. 2. The



age. 3. The position of the disease in the vertebral column. 4. The amount of bone destruction. 5. The amount of the callus formation. 6. The control of the patient. 7. The eagerness of patient and friends for shortened duration of treatment." The more vigorous the constitution, the better the risk, but it is surprising, Thomas says, how well the patients stand the operation. The question of age is considered, some fearing the graft may not grow but tend to increase deformity with growth. Experiments are in progress, he says, to determine the growth or non-growth of the graft which will be reported in the future. The position of the disease in the vertebral column may be a contra-indication, as in cases involving the high dorsal and low cervical region when the knuckle is so sharp and high that the occiput touches it and prevents space for working and in cases in which the disease is in the middle and upper cervical regions. He is inclined to favor the lower dorsal, lumbar and sacral regions as most favorable for the Albee operation and the middle and upper dorsal and cervical regions for the Hibbs operation. With great bone destruction such help in ankyloses as comes from the graft is indicated more than in those in which the small bone destruction can more easily be replaced from the vertebral bodies. The amount of callus formation and its ankylosing effect is the greatest element in the cure of these cases, and where it is large and strong enough to hold the back firmly, there is no need of a bone graft. The desire of the patient and friends to cut down the mechanical treatment should be, of course, considered, in deciding to operate. A number of cases are reported and the following tentative conclusions are offered: "1. The operation is not severe. It is a double operation, and the length of incision is longer than in most operations, yet the recovery from the immediate effect is quick and the suffering is small. 2. Cases with discharging sinuses near the field of operation should not be refused operative treatment on account of the sinus, unless it lies within the field of incision. 3. Complicating pulmonary tuberculosis is not a contra-indication in all cases. 4. If the ends of the transplant are loose, they absorb. If they extend beyond the spinous process, that portion not attached will absorb back to the firm attachment. 5. Loose ends and broken ends, as in the middle of a bent graft, grow, when later, through fixation by position and quiet, they become attached. 6. The three cases complicated with Pott's paraplegia have not markedly improved. The longest time elapsing since the operation of a paraplegia case has been six months. During this time the position has been good and such as to give hyperextension. 7. The young patients do better than the adults. 8. The operation has a distinct place in the treatment of selected cases of tuberculous spondylitis. 9. Albee's method of operation is preferable in the large majority of cases on account of the location of the disease and the size of the kyphosis. 10. Operative treatment should be followed by months of perfect quiet for the transplant."

**Blood Transfusion.** Report of 135 transfusions by the Syringe Canula System. E. LINDEMANN, New York. *Journal American Medical Association*, March 28, 1914.

Lindemann gives an analysis of 135 transfusions made by the syringe canula method in a large number of diseases, anemia, hemophylia, hemorrhages from various causes, etc. The ages of the patients ranged from 6 months to between 70 and 80 years. There were 243 canula insertions in the veins, and the largest amount transfused at one sitting was 2,000 c.c. from two donors. The largest quantity from one person at one sitting was 1,260 c.c., and there were numerous donors who gave from 900 to 1,000 c.c. The recuperative power of a healthy donor is remarkable. While reaction from a blood-transfusion from a near relative is generally least, in many cases alien blood is equally congenial. As regards blood-tests before transfusion, Lindemann's view has always been that unless the serologic report is respected it is useless to perform the test. In the large number of donors tested, a certain number of incompatibilities were discovered and eliminated. Laboratory work unless well done is worthless and it has its limitations in any case. Only once, however, in this series did the laboratory fail. One case is reported and a number of tables are given in the article. Linde-

mann says, "Not only is blood-transfusion a matter requiring skill, but problems in pathology, physiology, serology, immunity, chemistry and clinical medicine also constantly arise that require special study. Every large hospital in which such work is done should have on the attending staff a hematologist who can give to such work the degree of specialization necessary to meet the many problems and direct the work. A waste of good blood may be prevented and applications seen that might otherwise be overlooked."

**An Extensive Case of Plantar Warts.** R. L. SUTTON, Kansas City, *Journal American Medical Association*, April 25, 1914.

Sutton says that while the subject of plantar warts has been carefully studied by several authors within recent years, the true nature of the condition is seldom recognized even to-day. For this reason he reports a case which is the most extensive he has ever seen and which he has studied microscopically. These cases are notoriously resistant to treatment, and recurrence frequently takes place after excision. Of all the methods tried he gives first place to Pusey's carbon dioxid snow, fulguration second, and Roentgen treatment third. Before the snow or electric current is applied, the epidermal lids of the little tumors should be removed by a 10 per cent. salicylic plaster. Roentgen treatment is especially applicable when there are numerous lesions, which frequently disappear as if by magic. In the case reported all three methods were used and the cure was apparently complete in three weeks.

**The Disappearance of Sugar in Diabetics After Certain Pelvic Operations.** E. H. EISING, New York, *Journal American Medical Association*, April 18, 1914.

Eising reproduces the reports of four published cases, all he has been able to find in the literature, and reports two of advanced prostatic disease with pronounced and severe diabetes in which all traces of sugar had disappeared from the urine soon after operation. In both cases the absence of sugar was permanent. Eising says that in the present state of our knowledge it is useless to attempt any explanation. Spontaneous cure in diabetes has been known, according to Naunyn, but very rarely and only after traumatic or syphilitic diabetes of short duration. The wide distribution of the organs that may cause glycosuria in their pathologic condition might, he says, suggest, that certain pathologic conditions of internal secretions of organs in the pelvis might disturb the glycogenetic function. The temptation is great but further speculation is hardly wise at present. One inference is possible, namely, that diabetes must no longer be viewed as an absolute surgical barrier, at least for hysterectomy and prostatectomy, and that in some cases a possible cure may occur.

**Three Cases of Wiring With Electrolysis for Aortic Aneurysm.** H. A. HARE, Phila. *Journal American Medical Association*, April 18, 1914.

Three cases of wiring with electrolysis for aortic aneurysm, one of them heretofore in part reported, are described by Hare. During the wiring of the first case, the wire broke off but he was fortunately able to push the remaining wire beyond the broken piece and continue the operation. Investigation showed that the wire was an alloy of gold and copper and the electrolysis had eaten the copper and weakened it. Experiments made at Hare's instance by an expert on the effects of electrolysis on wire, using normal solutions to represent the blood, confirmed in this opinion and showed that a copper alloy is unsafe for this operation. In a previous article Hare reported a number of cases of this character and he reproduces his conclusions as then stated. He sees no reasons for changing his views but once more emphasizes the fact that only specially prepared wire can be used, and silver wire, since it does not coil, cannot be employed. If too much current is used serious damage may be done and when the street current is employed it is necessary that not only the table on which the patient lies should be insulated, but also that the operator wear thick rubber shoes and stand on a perfectly dry floor.



**Successful Resection of a Benign Tumor of the Liver.**  
(*Tumeur Bénigne du Foie. Résection Partielle du Foie, Guérison.*) DR. TÉMOIN, Bourges, France. *Archives Provinciales de Chirurgie*, March, 1914.

The case is reported not merely because of its rarity, but because the symptoms, the course, the physical examination, all pointed to a cancer of the liver. Témoins therefore believes that an exploratory laparotomy should be performed in all instances in which the diagnosis of cancer cannot be definitely established. The patient was operated upon by the author sixteen years before for cholelithiasis, and the gall-bladder was removed. She remained well until a year ago, and then began to complain of pain and vomiting. The physical examination indicated a carcinoma of the liver, as above indicated. At the operation the tumor was found incorporated in the right lobe of the liver, and appeared typical of a solitary carcinoma. The rest of the liver appeared normal. The tumor could be shelled out of the liver tissue without any difficulty, and the hepatic wound could be closed. Although it appeared, macroscopically, to be of cancerous nature, microscopically it proved to be inflammatory.

**The Treatment of Granulating Wounds With Dry Air.**  
(*Die Behandlung Granulierender Wundflaechen mit Getrockneter Luft.*) H. POTH, Berlin. *Deutsche Zeitschrift fuer Chirurgie*, Vol. 127, Parts 1 and 2.

The apparatus devised by Kutner was employed in all cases. It fulfills all the requirements laid down by Kutner: the air is really dry, it is free from bacteria, its temperature can be regulated, and the air strikes the surface of the wound in currents. The one objection to the apparatus is its expense. Splendid results are described by Poth. The secretions from the wound rapidly diminish. The flabby granulations quickly regain tone and appear healthy; they gradually contract and thereby reduce the size of the wound. The ill-defined epithelial edge of the wound becomes sharply demarcated, and the surface of the wound is soon covered by epithelium advancing from the edge. The epithelial covering of the wound by this treatment is firm yet very elastic.

**Massive Collapse of the Lung.** W. PASTEUR, London.  
*The British Journal of Surgery*, April, 1914.

This is differentiated by the author from the commoner instances of partial collapse of the lung. The condition is of interest to surgeons because it occasionally follows operations and, especially, laparotomy. Pasteur believes that massive collapse of the lung is often unrecognized, the condition being generally designated "post-operative pneumonia." He describes the symptoms and physical signs that he believes are characteristic of the condition. It may at once be said, however, that the only positive diagnostic sign of massive collapse of the lung is displacement of the heart towards the collapsed side. If the collapse is bilateral the diagnosis cannot be made. The only practical advantage in making the diagnosis relates to prognosis; that of post-operative pulmonary collapse is almost invariably good; that of pneumonia is, as well known, not so good. The mechanism of production of lung collapse is not well understood.

**Results of Three Years Clinical Work With a New Antiserum for Cancer.** W. N. BERKLEY, New York. *Medical Record*, April 25, 1914.

This report is a continuation of a previous one made two years ago. The serum (preparation not given) is given intravenously or subcutaneously in doses of five to 50 c.c. at intervals of a few days. If any benefit is derived it is seen at the end of six to eight injections. The report covers the result in 71 cases, 32 secondary or inoperable, 39 treated after primary operation. In none of the 32 secondary or inoperable cases does Berkley claim a cure, but he reports a number of instances in which complete disappearance of the tumor resulted, and others in which there was improvement locally and symptomatically. The report on the 39 cases treated after primary operation leaves much to be desired in clearness. Berkley reports such cases "successful" which did not recur when treated by his serum after operation. Why the "success" should

not be entirely referred to a well-executed operation, we do not see. The author also reports a few good results in recurrences after operation.

**A Magnetized Needle Holder.** C. M. STIMSON, Philadelphia. *New York Medical Journal*, April 25, 1914.

Stimson finds that a magnetized needle holder is quite useful in locating needles or pieces of needles in the course of operations. Such a needle holder may save, therefore, a little time. Any needle holder may be magnetized by placing it on a dynamo for three or four hours. The magnetic properties are not affected by boiling.

**Sciatica from the Orthopedic Viewpoint.** JAMES K. YOUNG, Philadelphia. *The International Journal of Surgery*, March, 1914.

From the orthopedic viewpoint the most common causes for sciatica are strains and displacement of the sacro-iliac joint, due to acute or chronic traumata. In unusual instances sacro-iliac relaxation may depend upon general debility. Sciatica as a result of the sacro-iliac lesion is not of distinctive type, and if the joint affection cannot be diagnosed (by physical examination and x-ray), the other, less common causes of sciatica, must be considered. The author enumerates these. When the diagnosis of a sacro-iliac lesion has been made the treatment is clearly defined: If there is displacement, reduction and a broad pelvic band to immobilize the pelvis. If there is no displacement, the application of the band. Local application of massage.

**An Additional Report on the Non-Operative Treatment of Carcinoma.** (*Weitere Erfahrungen bei der nicht Operativen Behandlung des Krebses.*) KROENIG, GAUSS, KRINSKI, LEMBECKE, WAETZEN, KOENIGSBERGER-FREIBURG. *Deutsche Medizinische Wochenschrift*, April 9 and April 16, 1914.

Although the highly technical aspects of mesothorium and x-ray treatment of carcinoma cannot be reviewed here, the tremendously significant results of the continued work of these investigators should be noted. Their histological examinations have shown that there is no striking difference between the results of Roentgen and those of mesothorium therapy of cancer. The selective action of these two on cancer cells is about the same, and both show the same relatively innocuous effect on normal cells. Complete retrogression of deep-seated cancer has been induced by these investigators by both methods, and without any pronounced injury to the surrounding tissues, the complete retrogression of these cancers is now of two years' duration.

In cases of cancer on the borderland of operability, the results of Roentgen-therapy are greatly superior to those of operation. Roentgen-therapy should also be chosen instead of operation in operable carcinomata when the tumor is readily accessible to "cross-fire." This statement will of course not be definitely established until five years of Roentgen treatment for this group of cases have passed.

**Congenital Tumors of the Neck.** C. E. CALDWELL, Cincinnati. *The Lancet-Clinic*, March 28, 1914.

Caldwell describes a case of neck tumor in a boy aged eight. He calls the tumor a congenital multilocular lymphocele, and discusses tumors of the neck region in the light of recent studies in the embryology of the structures of the neck. He quotes the conclusions of Savelli, "Serous congenital cysts of the neck are lymphangiomata. The pathogenic theory that they are derived from ductless glands, and the vascular theory, the derivation from angiomas, should be abandoned. We think that the congenital serous cysts of the neck are due to an arrest of the development of the lymphatic system of the cervical region. This hypothesis is based on what the sections of embryos of different ages have shown us and on what we know of the vices of development of the lymphatic system. It explains all the anatomical peculiarities of congenital cysts of the neck." The work of Florence Sabin is also quoted as corroborating this, for it shows that the lymphatic cavities known as the "jugular sacs," described by her as the fetal *anlagen*, the abnormal development of which gives rise to the multilocular cysts of the neck.

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## THE USE OF VACCINES IN CHRONIC EAR INFECTIONS, WITH REPORT OF CASES TREATED.

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Now that the first enthusiasm for the radical mastoid operation—which led to vast numbers being subjected to it—has somewhat subsided, and the profession has awakened to the actual results that have been produced by indiscriminate operative procedures on chronically suppurating ears, many are endeavoring to find some other method of treatment. Any careful and thoughtful reader of medical literature is bound to realize that the operation must be classed as an exceedingly dangerous one because of the subsequent conditions that so frequently arise.

This paper is to tell of the work that is being done in Dr. McKernon's clinic with vaccines in the treatment of chronic suppurations. In no disease is the golden rule more applicable, and it is pretty certain that there are few medical men who would submit either themselves or any member of their families to this dangerous operation until after every other method had failed. We rarely find it necessary to operate upon our private patients, for the simple reason that careful treatment, given personally, seldom fails to relieve. As a matter of fact, I have not performed a radical operation upon a private patient during the past eight years.

With the vast armies that flock to our clinics, we naturally have a far more difficult problem, having in so many instances to deal with filth, poverty, ignorance, and superstition, a combination that makes it almost hopeless to get results by any method, even operations failing. When these clinic patients are fairly intelligent and have risen above filth and actual poverty, they can be taught to understand their conditions and the correct methods of taking care of their ears, and with most gratifying results. There are always some cases, however, that appear to resist every effort, and during the past winter we have been trying autogenous vaccines, following the general plans as laid down by Dr. Nagle in her two papers in which she reported the results of vaccines in seventy cases. She did not give the

bacteriology nor describe the actual conditions found in these, so that her work has been questioned by many. This is an injustice to her, when it is realized that the large percentage of the cases were referred to her by such men as Drs. Blake, Cobb, Emerson, Mosher, Walker, and others in Boston, and that the laboratory work was done in the Harvard Medical School, so that all of it was under supervision.

She says: "In all, seventy cases have been reported by me during the past four years. Of these, sixty have remained dry; five failed to continue treatment; two have recurred; and three are still under treatment. It must be remembered that many of these cases were so persistent that the radical operation had been urged. While I recognize that the personal element enters into a report of any new line of treatment, yet I have endeavored to counteract this by having the results supervised."

Her last statement is undoubtedly true, and applies not only to her work but to the different results that will be obtained by any two men working on the same lines in a given series of cases.

In 1908, I reported the results of treatment of chronic suppurations with active cultures of the lactic acid bacillus in a series of cases. The striking results then reported have continued to be obtained in a great many others, and the cultures are generally the first thing ordered by me in all chronic cases. Many associates have told me that they do not get results, so that here again the personal element must play a part, for there is no doubt of the results in my hands, many of the patients having been observed by members of the clinic.

After reading Dr. Nagle's paper, we realized why we had failed to secure satisfactory cultures in our first attempt made about four years ago. We now first cleanse the canal with the vacuum cleaner, sucking out all visible secretions from the attic and Eustachian tube. Then a pledget of cotton saturated with alcohol is packed in the canal and kept there for five minutes. If the perforation is large enough, a sterile platinum loop is introduced into the attic and any secretion is transferred immediately to blood ascitic agar plates. If perforation is small, the Siegel otoscope is used to draw into

sight any secretion there may be, and transfer is then made. A slide is then smeared with secretion obtained on a cotton-covered applicator. All the laboratory work has been done by my associate, Dr. Dwyer. With this technic, we have never failed to secure growth of one or more pathogenic bacteria, from which active autogenous vaccines have been prepared.

Of the patients treated, several had been coming to our clinic for years; others had been treated elsewhere until operation was proposed, while others denied ever having had any treatment. All cases were diagnosed and assigned for treatment by the examining surgeon.

It is unnecessary to describe the actual condition of each individual ear. Suffice it to say that almost every possible pathological change was found in one or other of these cases, including polypi, cholesteatoma, adhesive bands, fistulae, caries, and constrictions. The patients included the young and old of both sexes, and were drawn from all quarters. Dr. Rae had performed a most successful operation on one ear of a patient, and left the other to be treated with vaccines, and he is gratified at the excellent results obtained. Several patients had already been operated upon, but discharge persisted.

Although we have had about 118 cases assigned to us, comparatively few (thirty-three) have been given vaccine, owing to the fact that in the others all discharges were arrested by local treatment before the autogenous vaccines could be prepared, or they had not returned for treatment. Owing to the small number of cases and the short duration of observation, this paper is offered only as a preliminary report, from which no positive conclusions are to be drawn. Before this can be done, it will be necessary to treat several hundred cases and be able to follow them over a period of years, to obtain the ultimate effects.

Since beginning this investigation, we have had 118 cases assigned or transferred to us. Cultures have been taken in only fifty-two of these, and vaccines have been administered in only thirty-three of these. This is explained in three ways: In a large number of cases, the discharge stopped under careful local treatment; some failed to return; and a few objected to the hypodermatic injections. We have included in the list seven cases of mastoiditis which were cured by vaccines about a year ago. Three other mastoid cases have been cured this winter that are not included. Dr. Brown has also reported eight other cases, treated by vaccines for furunculosis, in which chronic middle ear suppura-

tions existing at the same time were cured by the vaccine. One case of ours, still under treatment, had been operated upon twice in another clinic without relief, and was then referred to us, and is now practically well. Two cases were operated upon by another surgeon, but discharge persisted until vaccines were administered, when they promptly dried up.

Of the ten cases of mastoiditis, four were streptococcus infections; five, staphylococcus; and one, bacillus proteus vulgaris. All ten made prompt and complete recoveries.

We have not followed the dosage as used by Dr. Nagle, but have given much larger doses from the beginning, repeating every fourth or fifth day, and stopping as soon as the ears have become dry. The patients were then requested to report every two weeks for observation, so that any recurrence could be promptly noted. As Dr. Nagle states, under vaccine treatment the patient's general health almost invariably improves, this being especially noticeable in children.

In her first paper, Dr. Nagle reported that in a number of cases a stock laboratory staphylococcus vaccine had been given while waiting for the autogenous vaccine, and that marked improvement was frequently noted even when other bacterial infection was present, the resistance for the other bacteria being apparently raised by the stock vaccine. This interesting observation is clearly borne out in the eighth case reported by Dr. Brown, in which there were both furunculosis and middle ear suppuration present. His case, in which a mastoid operation had been performed and vaccines had been used elsewhere, is particularly interesting, illustrating again the importance of the personal element.

Four of our own cases were also double infections of furunculosis and chronic suppurations, and stock staphylococcus vaccines were given, with resulting cure of both conditions.

The first table gives the bacteria that were isolated in each case as the probable cause of infection.

A brief history of each case treated with vaccines and giving present results is presented in Table 2.

It should be noted that every case had received careful treatment for at least ten days before they received their vaccine, but had failed to respond. Those that did respond were not given vaccine.

As shown by the table, thirty-three cases received treatment with vaccines. Of these, two are noted as final "results unknown," owing to the patients failing to return after their ears became dry; eight were improved and are still under observa-

TABLE I.

Number of Cases.	<i>Staphylococcus Aureus.</i>	<i>Staphylococcus Albus.</i>	<i>Streptococcus L. Chain.</i>	<i>Streptococcus Diplo.</i>	<i>Streptococcus Muc. Caps.</i>	<i>Bacillus Pyocyaneus.</i>	<i>Bacillus Pseudo Diphtheria.</i>	<i>Bacillus Proteus Vulgaris.</i>	<i>Bacillus Mucosus. Caps.</i>	<i>Bacillus Hay.</i>	No. of Organisms* in Each Case.
1.	..	..	..	1	..	..	1	..	..	..	2
2.	..	..	..	..	..	..	..	..	..	..	1
3.	..	..	..	..	..	1	..	1	..	..	2
4.	1	..	..	..	..	..	..	..	..	..	1
5.	1	..	..	..	..	..	..	..	..	..	1
6.	..	..	..	..	..	1	..	..	..	..	2
7.	..	..	..	..	..	..	..	..	..	..	1
8.	1	..	..	..	..	..	..	..	..	..	1
9.	1	..	..	..	..	..	..	..	..	..	1
10.	..	..	1	..	..	..	1	..	..	..	2
11.	1	..	..	..	1	1	1	..	..	..	3
12.	..	..	..	..	..	..	1	..	..	..	1
13.	..	..	1	..	..	1	..	..	..	..	2
14.	..	..	..	..	..	..	..	1	..	..	1
15.	..	..	1	..	..	1	1	..	..	..	1
16.	..	..	..	..	..	1	1	..	..	..	2
17.	..	..	1	..	..	1	1	..	1	..	3
18.	..	..	..	..	..	1	1	..	1	..	3
19.	..	..	..	..	..	1	..	1	..	..	2
20.	1	..	..	..	..	..	1	..	..	..	2
21.	1	..	..	..	..	..	..	..	..	..	1
22.	..	..	1	..	..	..	1	..	..	..	2
23.	..	..	..	1	..	1	..	..	1	..	3
24.	..	..	1	..	..	1	..	..	..	..	2
25.	1	..	..	..	..	..	..	..	..	..	1
26.	1	..	..	..	..	..	..	..	..	..	1
27.	1	..	..	..	..	..	..	..	..	..	1
28.	..	1	..	..	..	1	..	..	..	..	2
29.	..	..	1	..	..	..	1	..	..	..	2
30.	1	..	..	..	..	..	1	..	..	..	2
31.	..	1	..	..	..	..	..	..	..	..	1
32.	..	..	..	..	..	..	1	..	..	..	1
33.	..	..	..	..	1	..	..	..	..	..	1
34.	1	..	..	..	..	..	1	..	..	..	2
35.	1	..	..	..	..	..	1	..	..	..	2
36.	1	..	..	..	..	..	..	..	..	..	1
37.	..	..	1	..	..	..	..	..	..	..	1
38.	..	1	..	..	..	..	..	1	..	..	2
39.	1	..	..	..	1	..	..	..	..	..	2
40.	..	..	..	..	..	1	..	..	..	..	1
41.	1	..	..	..	..	1	1	..	..	..	3
42.	..	..	..	..	..	1	1	..	..	..	1
43.	..	..	..	..	1	..	1	..	..	..	1
44.	..	..	..	..	1	..	..	..	..	..	1
45.	..	..	..	..	1	1	..	..	..	1	3
46.	..	..	..	..	..	..	..	..	..	..	2
47.	1	..	..	..	1	..	..	..	..	..	1
48.	..	1	..	..	..	1	..	..	..	..	1
49.	..	1	..	..	..	1	..	..	..	..	2
50.	..	1	..	..	..	1	..	..	..	..	2
	17	6	8	2	8	15	15	5	3	1	

\*1 organism, 24 cases; 2 organisms, 20 cases; 3 organisms, 6 cases.

TABLE II.

No. Hosp. No.	Bacteria.	Age.	Duration.	Remarks.	Result.
1. 652851.	Bac. Pyo. & Proteus Vulgaris.....	18 yrs.	ysr.	Persistent discharge following Radical. Great improvement after five doses. Refused more.....	Improved
2. 669685.	No culture taken .....	3 yrs.		Mastoids operated upon, March 17, 1913. Followed by erysipelas. Feb. 11, 1914. Stock vac. Ears dry after third dose .....	Cured
3. 676070.	S. P. Aur., Strep. Caps. Muc. Bac. Pyo.....	10 yrs.	5 yrs.	Persistent discharge following Radicalop. Oct. 30, 1913. Jan. 19, 1914, started vaccine. Feb. 16, ear dry and healed. March 6, dry .....	Cured
4. 696043	S. P. Aur., Bac. Pseudo-diphtheria....	22 yrs.	?	Persistent discharge following two operations. Ear became dry after four doses.....	Cured
5. Brown.	S. P. Aur., & S. P. Albus.....	29 yrs.	6 yrs.	Had 4 operations, last 4 years ago. Discharge persistent. Vaccines been used. Ear dry after 10th injection. Remained so 4 months.....	Cured
6. 656806.	S. P. Aur. ....	6 yrs.	1 yr.	Under treatment for recurrent discharge for 11 months. Dec. 13, 1913, began autogenous vaccine. 4 doses. Ears dry after 2d. Dry, March 2 .....	Cured
7. 657816.	S. P. Aur. (Mastoiditis).....	49 yrs.	1 wk.	Mastoiditis treated for 9 weeks. Refused op. Received 4 doses auto. vaccine. Ear dry after 2d dose and remained so .....	Cured
8. 661496	Strept. Caps. Muc., Bac. Pyo.....	4 yrs.	3 yrs.	Under treatment for 10 months. Irregular in visits. Gave 2 injections and ear became dry. Not seen since .....	Unknown
9. 662681.	Strept. Caps. Muc. (Mastoid).....	30 yrs.	4 mos.	Chronic mastoiditis with fistula in post. canal wall. Intense pain. Gave 3 injections. Ear dry and fistula closed and remained so.....	Cured
10. 664364.	S. P. Aureus. (Mastoid).....	40 yrs.	2 wks.	No improvement after 12 days' treatment. Advised operation. Refused. Gave 3 injections. Ear dry and rapidly became normal.....	Cured
11. 667121.	S. P. Aureus. (Mastoid) .....	38 yrs.	3 wks.	Gave 3 injections. All symptoms relieved.....	Cured
12. 670167.	Strept. Caps. Muc. Bac. Pseudo (Mastoid) .....	36 yrs.	10 days	Operation urged, but refused. Treated for 3 weeks, then gave vaccine. Ear well after 3d injection and no return .....	Cured
13. 680188.	S. P. Aur. & Bac. Pyo. (Mastoid)....	14 yrs.	3 yrs.	Operation advised Aug. 15, 1913. Discharge persisted until Jan. 2, 1914. Ears became dry after 5 doses. Not seen since Jan. 28, 1914.....	Unknown

14. 681313.	Strept. long chain, & Bac. Pyo.....	10 yrs.	1 yr.	Under treatment for year past at irregular intervals. Developed furuncle. Gave 3 injections. Ear became dry and remained so far past month.....Cured
15. 686877.	Bac. Proteus Vulgaris (Mastoid).....	25 yrs.	2 wks.	After 2 weeks of treatment was transferred for vaccine. All pain and discharge ceased after 2d injection. Two more given. Remained so.....Cured
16. 690360.	Strept. long chain, B. Pseudo. Bac. Muc.....	15 yrs.		Was treated without benefit for 2 weeks. Ears became dry after 2d injection and remained so.....Cured
17. 690843.	Bac. Pyo. ....	20 yrs.	1 yr.	Was treated without benefit for 3 weeks. Ear became dry after 4 injections. Recurred after 12 days. Advised ossiculectomy .....Improved
18. 691349.	S. P. Aureus. Bac. Pyo. & unidentified bacillus .....	19 yrs.	4 yrs.	Marked improvement after 3 weeks' treatment. Vaccine then given. Ear dry after 3 doses. Ethnoiditis (S. P. Aur.) also cured for past 3 months.....Cured
19. 691665.	S. P. Aureus. ....	28 yrs.	ysr.	Under treatment elsewhere for months. Both ears became dry after 2d injection. Remained dry for 6 weeks. Then slight recurrence. Renewed injection .....Improved
20. 692763.	Stock vaccine .....	6 yrs.	2 yrs.	No improvement after 10 days' treatment. Ears dry after 2d dose. Recurred after seven days. Became finally dry after 5th dose. Dry 2 months later .....Cured
21. 693241.	S. P. Aureus. ....	7 yrs.	1 yr.	No improvement after 2 weeks' treatment. Ears dry after 3d injection and remained so. Arm infected by vaccine .....Cured
22. 694357.	S. P. Aureus. ....	22 yrs.	3 yrs.	Ears improved under treatment but discharge persisted. Six injections given, but discharge persists. Mouth in very bad condition. General Eczema .....Improved
23. 694382.	S. P. Aureus, & Bac. Pyo.....	25 yrs.	3 yrs.	Ears became dry after 4th injection and had remained so at the end of six weeks.....Cured
24. 695352.	Stock vaccine .....	20 yrs.	ysr.	No improvement after 10 days' treatment. Developed furuncle. Gave 5 injections stock staphylococcus vaccine. Ears dry for past 6 weeks.....Cured
25. 695402.	S. P. Albus .....	26 yrs.	ysr.	Some improvement after 10 days' treatment. Ear dry after 3d day. Remained so to date.....Cured
26. 696015.	? .....	21 yrs.	ysr.	L. ear radical operation. Referred for R. ear. Ear dry after 6th injection for 2 weeks. Then slight discharge appeared. Still under treatment.....Improved
27. 696485.	S. P. Aureus .....	19 yrs.	5 yrs.	Received 5 injections, but at irregular intervals. Ears improved. Refused to continue his treatment unless regular visits.....Improved
28. 697510.	S. P. Aureus & Strept. Caps. Muc.....	1 1/2	3 mos.	Treated for month without benefit. Then gave vaccine. Ears dry after 3d dose. Remained so to date .....Cured
29. 698144.	Stock vaccine .....	6 yrs.	4 yrs.	Gave stock vaccine because of furuncle. Ears became dry after 6th dose. Remained dry for past four weeks .....Cured
30. 698663.	Strept. Caps. Muc. ....	9 yrs.	3 yrs.	Under treatment at intervals for over 1 year. Vaccine given Feb. 4 and 8, 1914. Ears had remained dry up to March 6 .....Cured
31. 699073.	S. P. Albus .....	8 yrs.	4 yrs.	Has had treatment at many places. Gave stock Staphylococcus. Ears dry after 2d injection for first time in years .....Cured
32. 699348.	Bac. Pseudo-diphtheria .....	11 yrs.	2 yrs.	Ears much improved after four injections. Still under treatment .....Improved
33. 701027.	Strepto. Caps. Mucosus .....	23 yrs.	8 yrs.	Has received 2 injections. Patient reports great improvement. Still under treatment. Mouth very septic .....Improved

Unknown, 2; Improved, 8; Cured, 23.

#### VACCINE.

for seven cases who made but one visit.

WITHOUT Cultures were taken and vaccines were made				
1. 690811.	Bac. Pyo., & Bac. Pseudo., & Bac. Muc.....	15 yrs.	3 yrs.	Ears became dry after 2d visit. Had remained so for two months when last seen .....Cured
2. 690813.	Bac. Pyo. ....	20 yrs.	2 mos.	Removed polyp Ear dry after two weeks' treatment .....Cured
3. 693257.	? .....	28 yrs.	3 yrs.	Removed polyp. Ear dry after eight days' treatment.....Cured
4. 694329.	S. P. Aureus .....	6 yrs.	1 yr.	Had been under treatment for one month. Was then transferred for vaccine. Ear dry after 1st treatment and remained .....Cured
5. 696034.	? .....	26 yrs.	ysr.	Ear had been operated upon 3 years previously. Discharge began 2 weeks ago. So much improved on 2d visit; vaccine not used .....?
6. 696410.	S. P. Aureus. & Bac. Pseudo. ....	43 yrs.	1 yr.	Ear dry and remained so after 1st visit.....Cured
7. 696928.	? .....	17 yrs.	2 yrs.	Offensive discharge. Distressing eczema. Ear dry and eczema well at the end of 1 week.....Cured
8. 696986.	Bac. Pyocyanus .....	23 yrs.	1 yr.	Ear dry after 1st visit. Remained dry for one week and has not been seen since .....Cured
9. 697590.	Bac. Pyocyanus .....	4 yrs.	4 mos.	Ear dry after 2d visit. Remained dry for one week and has not been seen since .....Cured
10. 699345.	No growth .....	28 yrs.	ysr.	Removed granuloma. Ear dry on 2d visit. Not seen since .....Cured
11. 690286.	Bac. Pyo. & Bac. Pseudo. ....	5 yrs.	?	Made only 3 visits. No improvement.....Unimproved

Unknown, 1; Unimproved, 1; Cured, 9.

tion; twenty-three have dry ears and are seen about every two weeks. All have appreciated the personal interest shown to them, and it is fairly certain that they will return on the first indication of any discharge appearing.

As said before, all our cases, except those of mastoiditis, have been seen during the past five months only, and we are not justified in claiming absolute cures for them. We hope to follow them for several years, as has been done by Dr. Nagle,

and to report them again, possibly each year. In our minds, we are convinced that most excellent results have been obtained with the vaccines, especially so as many of our cases had resisted all other efforts, even failing to dry up after operation.

As so many cases have dried up under our local treatment, it may be interesting to state the methods employed. It is well to remember that in treating any suppurative process in the ear, it is necessary to keep all moisture out of the canal. If the

patients are told to irrigate, it is safe to say that the canals are never actually dried after the irrigation, and the treatment will be prolonged indefinitely. Bichloride of mercury irrigations invariably keep up discharge, if persisted in, due to the irritation of its constant presence in the canal. We have found that active cultures of the bacillus *Bulgaricus* will promptly overcome offensive discharges in most cases, and when the membranes are thickened the cultures frequently restore them to a healthy color after a very few applications. We employ suction with small canulas to remove all secretions from the canals, tympani, and attics, and as soon as the offensiveness disappears sufficient drying powder—aristol or nosophen with compound stearate of zinc or boric acid—is blown in to fill the inner portion of the canal. At subsequent visits, the canal is cleaned with suction, or alcohol, or cotton applicators if there has been no secretion, and is again dusted, and the patients are told to do nothing except to wipe out any secretion that may come.

In private practice, I have yet to see a case that does not dry up and remain dry under this method of treatment, when combined with proper nasal care.

40 EAST 41ST STREET.

#### THE DOSAGE OF HEXAMETHYLENAMIN.

It would thus be possible, by taking two doses of fifteen grains in twenty-four hours and passing water as seldom as possible, to keep the urine in the bladder continuously mixed with a strong solution of formaldehyde. In diseases of the bladder in which frequent micturition is a symptom the period during which the bladder is under the influence of formaldehyde is reduced to about six or eight hours, the time during which the drug is being excreted in quantity by the kidneys. In such cases small doses frequently repeated (seven grains every four hours) will be more effective in giving a continuous antiseptic action. Five or ten grains taken three times daily is the commonly prescribed dose. An increase in the dose to fifteen or twenty grains three times daily will be followed by an increased output of formaldehyde in the urine. In a number of cases under my observation no formaldehyde was produced in the urine when the patient was taking five or ten grains, but there was abundance of formaldehyde with doses of fifteen or twenty grains. Or when the formaldehyde reaction was feeble with the smaller doses it became powerful when the dose was doubled or trebled.—J. W. THOMSON WALKER in the *Edinburgh Medical Journal*.

#### THE BACTERIOLOGY OF CHRONIC PURULENT OTITIS.\*

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The chronically suppurating ear has always presented many problems to the otologist. Since not much investigation has been carried on with reference to the bacteriology and the systemic allied conditions of this form of suppuration, it was decided to take a series of cases of this kind, such as are met with in the ordinary daily routine, and investigate the discharge with special reference to (1) the bacterial flora (2) the cellular elements, and (3) the matrix. These three embrace the main factors of importance in any discharge.

Since September, 1913, all cases of otitis media suppurativa chronica on Dr. McKernon's service at the Manhattan Eye, Ear and Throat Hospital have been assigned to Dr. Haskin and myself for the purposes of carrying out the above investigation. Early in this work we found that with the time at our disposal, we could not hope to follow out all the lines above outlined, so that as time went on, we narrowed the investigation down to the first part, viz., the bacteriology and the preparation of autogenous vaccines in suitable cases. Dr. Haskin and Dr. Brown are reporting the clinical use of the vaccines; Dr. Haskin mainly the use in the chronic purulent cases and Dr. Brown in furunculosis. I shall confine this contribution to the laboratory end mainly and the report now is intended as a preliminary one only, the conclusions drawn being tentative only, as no one realizes better than I that we are still only on the threshold of knowledge concerning vaccines and that time and wide experience will alone solve our difficulties.

In our work on the bacteriology of chronic suppurative otitis, the technique employed was, with a few minor differences, the same as that used by Miss Gignoux and the writer in 1910, when employed on similar work on the tonsil. Smears of the discharge, taken in the way indicated by Dr. Haskin, were made on blood or ascitic fluid plates, after the manner of making streak plates and were then incubated for twenty-four hours. The different colonies were then fished and stained films were made and the colony recovered on slant agar or in the case of the more fastidious organisms on the

\*From the Department of Laboratories, Manhattan Eye, Ear and Throat Hospital, New York City. Read before the Otological Section of the New York Academy of Medicine, March, 1914.



richer media, such as blood serum, ascitic agar, etc., and, if they proved to be organisms that were capable of identification morphologically and were known to have any pathogenic power or even regarded as remotely having this, vaccines were prepared and used even before the final identification of the organisms. Direct smears were also made and stained by aqueous stains and by Gram stains, so as to serve as a check upon the plates. All organisms were studied on the various media and identified.

In fifty-three cases we found the following organisms: *staphylococcus pyogenes aureus*, seventeen times; *staphylococcus pyogenes albus* and *citreus*, six; *streptococcus mucosus*, eight; *streptococcus hemolyticus*, eight; *pseudo-diphtheria* (Hoffmans' and Xerosis), fifteen; *pyocyaneus*, sixteen; *proteus*, five; *Klebs-Löffler*, one; *bacillus mucosus capsulatus*, three. The *bacillus subtilis* and some other air-organisms were repeatedly found, but were discarded. In many of the direct smears, there were any number of *spirochaete* found, varying from that of Vincent to the *refrigens* and those found in the throat. It is my opinion that the true significance of the discharges from the middle ear will not be fully appreciated until an investigation is made of the rôle of these so-called innocent organisms from the throat, the *torulae*, *spirochetæ*, etc., so often found in this class of cases and always discarded. An arbitrary division of bacteria into pathogenic and non-pathogenic varieties is attended with many difficulties in the case of the ear, since potentiality for serious mischief in this organ which so many reputed saphrophytes possess, renders such a classification of doubtful expediency. There are perhaps few organs which present a greater variety of bacteria than does the ear, particularly in the chronic forms of disease of this organ. Thus with the above technic, organisms, ordinarily looked upon as pathogenic, could be isolated in the big majority of cases, practically in 95 per cent. Some of these cases were of years duration and in all cases over months, so that the bacterial flora as time went on might have changed considerably, but the fact that pathogenic organisms could so be isolated encouraged us to try the vaccines in these cases. No anaerobic cultures were made and no attempt was made to isolate the acid-fast organisms or by animal inoculations and agglutination experiments to differentiate the various strains of streptococci, as our primary object was to have a practical method of isolation and one that could be easily applied. No attempt was made to differentiate the *bacillus butyricus* or its allied groups.

It is well known that in the chronic discharges we find very frequently acid-fast organisms that resemble the tubercle bacillus, but which under rigid staining decolorize, and it is probable that these are strains of bacilli that have been acted upon by the *bacillus butyricus*, an organism found very often in the ear and which is non-pathogenic in itself, but when grown in simbiosis with other organisms change these latter so that they have different staining reactions, and if an organism can be changed in this respect, it is not a far step to assume that it can be changed in other more important respects, as is well known with other sets of organisms.

With regard to the cellular elements, we think the study of these is well worth while. Under cytology, we may divide the cells into two groups, the epithelial and the mesoblastic. Epithelial cells are meatal, tympanic, or glandular. The commonest type is of course the squame, which in a healthy ear is absolutely confined to the meatus, but in chronic diseases invades the antro-tympanic cavity and becomes one of the most striking features of the discharge. These squames fall into two classes—the old and the young. The old are acid-fast, have either no nucleus or the area where the nucleus should be is only a shadow. On the other hand, the young or recently formed squames have large oval or round nuclei, which readily take the stain, are not acid-fast and are easily decolorized. We of course have all grades in between these two extremes. This point may not seem of much importance, but this acid-fast property of old non-nucleated squames affords not only presumptive evidence of a cholesteatomatous mass involving the antro-tympanic cavity assuming, of course, that the specimen was taken from the tympanum and not from the meatus, but fragments may be mistaken for the Tb. The normal tympanic epithelium is only seen in the early acute stage of infection; such epithelium does not occur in chronic discharges, the tympanic lining having been transformed into the squamous or epidermal type.

We next consider the mesoblastic cells and these may be divided into the wandering and the fixed cells. The wandering cells are very important. They comprise the leucocytes, the lymphocytes, and the plasma cells. The leucocytes and lymphocytes are usually classed as pus cells, but inasmuch as they are unlike in function, structure, and significance, some distinctions between them are necessary. The leucocyte of a recent or acute exudate is very sharply defined and the nucleus stains deeply, but degeneration soon sets in and we have well-known series of changes which are in-

dicative of the death of the cell. As the discharge becomes chronic, large mononuclear leucocytes become more numerous, in contrast with the very acute discharge, in which the polynuclear cells predominate. The lymphocyte is smaller than the leucocyte, with a slight amount of protoplasm, a large clear nucleus, and stains very deeply. The important thing is that in acute exudate changes about one lymphocyte can be counted to twenty or thirty leucocytes, but when the discharge comes from a granulation source the lymphocytes are strikingly increased, sometimes being equal in number to the leucocytes. Thus the presence and the proportion of these cells afford a reliable evidence of the existence of granulation tissue and the nature of the pus-producing process. They possess little, if any, phagocytic power. It must be remembered, however, that the proportion of lymphocytes in infants is much higher than in adults.

The next class of cells are the fixed cells and of these the epithelioid elements are those most frequently found. These cells are derived from the lining of blood and lymph channels and also from the perivascular spaces of the arterioles. They play an important part in the granulomatous formations, especially tuberculosis, etc. Although seen sometimes in acute inflammations, their presence in large numbers is characteristic in a chronic discharge of tuberculosis.

We thus see that an examination of the cellular elements may be a great aid to diagnosis and prognosis in a chronic purulent otitis.

Not much need be said about the matrix, except that at times we can demonstrate the flat rhombic crystals of cholestrin and the fatty acids, characteristic of old, desquamative changes in cholesteatoma.

To sum up then shortly, the conditions responsible for chronic discharge from the middle ear are so varied that pathological accuracy calls for some differentiation. As most frequently happens, granulation tissue is responsible for the pus. Evidence of this is afforded by the presence of leucocytes of all kinds, large, small mononuclear and polynuclear, normal and degenerated, but especially by lymphocytes which are very numerous, while epithelial cells are not uncommon. Bone disease may be marked by the presence of myelocytes or osteoblasts or chemical analysis shows the presence of an increased amount of bone salts.

Cholesteatomata is indicated by the presence of closely packed squames with or without bacteria, a distinction that may at first glance appear unnecessary, but is really of great importance, especially when the cells are of antral origin, for a septic

cholesteatomata in that situation affords a stronger indication for radical measures than a non-septic one—an interpretation amply supported by examination of antral contents removed at operation.

Among chronic discharges we meet with is one which deserves special attention—it is very profuse, fetid, opaque, and like cream. On examination, it is found entirely free generally from cells, either epithelial or septic leucocytic, but consists of throat organisms in an albuminous matrix—not true pus, therefore, but a polymicrobial emulsion. With such a discharge, in which there are spiral and fusiform bacteria of many varieties and no cells, the existence of an active granulation surface can without doubt be excluded. Thus here, active aural measures and measures to do away with the original infection are called for. It is the differentiation and identification of such a condition that will repay you in the knowledge gained. The throat organisms are such as *spirochetæ fetida*, *bacillus fusiformis*, *leptothrix*, etc. Also there are the organisms found in *pyorrhea alveolaris*, in tonsillitis, etc. In acute exacerbations, the influenza bacillus, *micrococcus catarrhalis*, etc., are found, but we did not find them in the uncomplicated chronic condition.

Only six cases were examined carefully as to their cellular contents and as to the matrix, but we believe that more attention is going to be paid to these parts of the discharge in the future.

We have drawn at some length on the admirable work of Wingrave and Milligan, in which the ear discharges receive the attention they deserve.

#### LATENT MASTOIDITIS.

We may speak of a mastoiditis becoming latent when an inflammation of the mastoid cells persists after apparent termination of the acute inflammation of the middle ear. Otoscopic examination may reveal an intact tympanic membrane, which has not returned to its normal color; there may or may not be a mild degree of deafness; the long process of the malleus may be ill-defined, or there may be, what is still more important, a hyperemia or slight bulging at the upper posterior quadrant of the tympanic membrane. In other cases, the tympanic membrane may be absolutely normal in appearance, and it is quite an easy matter for us to overlook a latent mastoid inflammation if we forget that a negative finding of the tympanic membrane has no significance as far as the condition of the mastoid cells is concerned.—WM. MITHOEFER in the *Lancet-Clinic*.

ON THE TREATMENT OF FURUNCULOSIS  
OF THE EAR WITH VACCINES.\*

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Since the introduction of vaccine therapy, as suggested on a scientific basis in 1776 by Jenner, the number of research workers has been large, and most of the recent work in this field has followed lines laid down by Wright of London.

Although opposition to vaccine therapy was at first almost universal, even as late as 1910, when Dwyer furnished his very valuable article on the production and use of the vaccines, many of our profession were still loud in their denunciation of this form of treatment. Nearly five years have passed, and to-day one is safe in saying that owing to the painstaking and laborious work of the investigators in this field of work we have a therapy, the value of which can scarcely be overestimated and that, when used in the correct way, at the right time, we have in the His extract of leucocytes and in the vaccine agents for combating certain diseases that have no equal and the use of which has abundantly proved all that is claimed for them.

There are even now many physicians attempting to secure results from the vaccines, some of whom express themselves as having no faith in these remedies, and I am inclined to believe that such skepticism is the result either of a lack of acquaintance with the preparation used, or of using commercial vaccines, or of having used a wrong preparation at the wrong time, or upon the wrong patient.

At the very beginning it is necessary to recognize the fact that the His extract of leucocytes, the serums and the vaccines, are three independent and wholly different preparations, performing their work in the system by different physiological methods, and not all intended for use in the same patient at one time.

To consider now the vaccine therapy, in its relation to aural lesions, and particularly furunculosis, the foundation of this is the fact that when a foreign body, especially one of an albuminous nature, is injected into the human system, it stimulates the system to the formation of antibodies, which combat the offending organisms, and that each particular strain has power only to form antibodies of a corresponding nature in the system. It is easy to see that if the physician injects into a patient a strain

of staphylococcus vaccine, while the infecting organism in the patient's system is the streptococcus, the natural result will be failure.

Therefore, two facts are self-evident:

First: The right vaccine must be used.

Second: A correct diagnosis ought to be made before beginning treatment.

There seems to be no limit to the number of articles written upon this first question; what vaccine shall be used? The answer, without any hesitation, is, an autogenous vaccine.

Autogenous vaccines are procured from cultures made from the patient who is to receive the treatment. In autogenous vaccine the species of bacteria are isolated and grown in pure culture from which the vaccine is produced, and when used in a single strain, or in combination, the proper dosage is regulated at the time of administering it.

The so-called stock vaccine is in many cases the product from some original strain, kept no one knows how long, on artificial media in the manufacturer's laboratory, so that the latter vaccines made from this strain are quite changed from the original. The name "polyvalent" has been applied to a shotgun charge of mixed stock vaccines, the purpose of which is to hit a minute and possibly uncertain species of bacterium with a charge of therapeutic ammunition that will spread over a large area.

There is too often little correspondence between their contents and the organisms which they are intended to combat and moreover their use is unscientific and decidedly unfair to the patient.

In the foregoing I refer to vaccines for the treatment of furunculosis of the ear and allied aural conditions only, and while I do not assert that no good results have been secured by commercial vaccines in these lesions, I insist that the freshly prepared and autogenous vaccines are far superior to and yield much better results than the commercial, and should always be used when possible to secure.

*The second question related to diagnosis.* It is evident from what has been said about the formation of antibodies, that the first absolutely essential thing in the successful treatment of infectious conditions of the ear by vaccine is the establishment of a correct diagnosis. On more than one occasion have I heard from critics who have said that they have no use for vaccines, because they have tried them in every way, only to meet with disappointing results. Now, what has been the cause of these failures? Of course, anyone can put some pus on a slant agar, heat it to 60°, dilute it with saline solution and then inject the resultant mixture into an unsuspecting patient, and probably have failure, so

\*Read before the Section on Otology of the New York Academy of Medicine, March 13, 1914.

No.	Name.	Sex.	Age.	Location.	Ear.	Duration.	Prev. Treatment.	Discharge.	Pain.	Number Injections.	Amount.	Result.	Remarks.
1	J. H.	F	28	Both canals closed.	R-L	2 Weeks	Camphor oil	2 Weeks	Intense	1	300	?	Patient objected to this form of treatment.
2	F. J. O.	M	46	Anterior and floor.	L	1 Week	None	No	3 Days	3	400	Cure	Pain gone after 6 hours. Had great amount of oedema. Pain gone after 6 hours.
3	L. P.	M	34	Anterior wall.	L	3 Days	None	No	Severe	3	300	Cure	
4	B. C.	F	13	Polyp from attic half filling Ex. Aud. canal. O. M. P. C.	R	1 Year	Everything	Profuse	No	15	400 250 to 700	Cure	Removed polyp. Discharge continued profuse. Discharge much less after 2d injection. Absolutely dry for 8 months. No sign of polyp. Staph. A. & A. mixed.
5	M. F.	M	27	Floor.	R	24 Hours	None	No	Slight	1	250	Cure	No pain after 1st injection. No discharge after 2d.
6	M. R. L.	M	20	Anterior wall.	L	1 Month	None	Slight	Slight	3	250 to 400	Cure	
7	L. L.	F	18	Diffuse complete occlusion of canal oedema-marked.	L	Some Days	None	Yes	Great	3a	350	Cure	Pain gone after 12 hours. Ear dry after 4 injections. Gave 3 autogenous.
8	J. H.	F	33	Diffuse.	L	4 Days	None	No	Much	3s	750 to 250	Cure	
9	F. D.	F	13	Floor.	L	2 Days	Incised elsewhere.	Yes	Intense	9s	400 to 250	Cure	A very angry one. Improved slowly. Gave 4 autogenous mixed. Dry after third injection.
10	J. J. K.	M	29	Aural Fistula following Mastoid. O. M. P. C.	L	7 Years	Operated 4 times. Last 4 years ago. 7 vaccines at Army Hospital. No improvement	Very profuse in front and behind.		4a	600	Cure	Used mixed Staph. Aureus, and albus pus stopped after 10 injections. Fistula healed after 14. Has been dry and healed 8 months.
11	J. K.	M	28	O. M. P. C. & F. furuncle A. & F.	L	Years	None	Much	Moderate	3s	250 to 600	Cure	Improved slowly under stock Autogenous mixed. Seven injections given.
12	A. C.	M	37	Diffuse, canal occluded.	L	4 Days	None	No	Moderate	7a	400	Cure	
13	D. B.	M	19	Diffuse.	L	5 Days	None	No	Slight	2	500 to 400	Cure	
14	J. D.	M	26	O. M. P. C.	R	6 Years	Many things	No	Slight	3	500 to 250	Cure	Did not return. Staph. aureus pure.
15	H. D.	F	20	O. M. P. C.	L	6 Weeks	None	Yes	Yes	3	200 to 400	Cure	
16	S. S.	M	19	O. M. P. C.	L	1 Week	None	Yes	Much	3	250 to 500	Cure	Staph. aureus and albus.
17	A. S.	M	49	Diffuse, angry, much oedema.	R	2 Weeks	None	No	Intense, no sleep	9	250 to 750	Cure	No pain after 12 hours; no oedema in front of auricle after 4 injections. No discharge after 2d injection
18	B. S.	F	65	Diffuse.	L	2 Weeks	None	Yes	Intense	9	250 to 750	Cure	
19	L. H.	F	41	Diffuse.	R	5 Days	None	No	No sleep	3	250 to 750	Cure	
20	L. L.	F	21	Anterior wall.	L	1 Week	None	No	Moderate	1	750	Cure	
21	B. Z.	F	38	Diffuse.	L	10 Days	Incised elsewhere	Yes	Moderate Intense after incision	5	400 300 to 750	Cure	No pain after 2 injections.
22	E. B.	F	41	Floor and anterior.	L	5 Days	Incised	Much	Intense	2a	300 to 700	Cure	Mixed Staph. A. & A.
23	A. B.	M	35	Anterior wall.	L	1 Week	Incised	Much	Yes	1s	700	Cure	Did not return.
24	K. C.	F	23	Diffuse.	R	2 Weeks	None	Yes	Intense as tho dragging	1s	300 500 to 750	Cure	Staph. aureus.
25	F. A.	F	20	Floor both.	R-L	Days	Both	Yes	Yes	3a	750 300 to 500	Cure	
26	F. C.	M	23	Floor and anterior.	L	4 Days	None	No	Yes	2	500	Cure	Pain gone in 12 hours.
27	F. L.	F	17	Diffuse.	L	13 Days	Family doctor, no improvement	Yes	Yes	3	300 250 to 500	Cure	Pain gone in 12 hours.

No.	Name.	Sex.	Age.	Location.	Ear.	Duration.	Prev. Treatment.	Discharge.	Pain.	Injections.	Amount.	Result.	Remarks.
28	J. E.	M	28	Diffuse.	L	3 Days	None	Yes	Yes	2	350 to 500	Cure	These were the same patients. The right developed a furuncle as the left ear was nearly well.
29	J. E.	M	28	Diffuse.	R		None	No	Yes	3		Cure	
30	R. E.	F	31	Floor and anterior O. M. P. C.	L	6 Months	None	Ear	Moderate	4	300 to 600	Cure	Staph. A. & A.
31	L. S.	F	23	Floor and anterior.	R	1 Week	Yes	No	Yes	2	500 to 300	Cure	
32	M. M.	F	35	Diffuse.	L	2 Weeks	Lanced four days ago	Yes	Yes	1	300	M.	Did not return.
33	J. W.	M	16	Diffuse.	L	1 Week	None	No	Intense on motion	2	300 to 500	Cure	One Staph. A. & A. One auto-genous S. Aur.
34	C. M.	M	29	Anterior wall.	L	7 Days	None	Much	Intense	3a	250 to 600	Cure	No pain after 18 hours.
35	M. R.	F	24	Diffuse.	L	2 Weeks	Incised else-where	Yes	Yes	3	350 to 500	Cure	
36	F. S.	M	31	Floor.	R	8 Days	None	No	Moderate	2	300 to 400	Cure	
37	M. R.	F	29	Diffuse.	L	10 Days	Wax removed at other hospital	No	Intense Days	3	300 to 500	Cure	
38	A. M.	F	42	Diffuse.	R	3 Weeks	None	No	Moderate	4	300 to 500	Cure	
39	G. W.	M	25	Diffuse.	R	10 Days	None	No	Intense	1a	500 to 300	Cure	
40	F. W.	M	19	Anterior and floor.	L	3 Days	None	No	Moderate	2s	500 to 300	Cure	
41	M. B.	M	21	Anterior and floor.	R	4 Days	None	No	Yes	5	500 to 250	Cure	Pain gone after 10 to 12 hours.
42	J. J. K.	M	29	Anterior and floor.	R-L	3 Days	None	Yes	Yes	3	500 to 250	Cure	
43	A. M.	F	45	Anterior.	R	1 Week	None	Yes	Yes	3	500 to 250	Cure	This furuncle had begun to "head." It did not rupture and dried up completely. Refuse vaccine.
44	M. K.	F	49	Diffuse.	L	2 Weeks	Poulticed by advice of doctor	No	Intense, no sleep.		500		
45	A. P.	F	24	Diffuse enlarged cervical and mastoid glands.	L	2 Weeks	Otisville	No	Great	6	250 to 750	Cure	Patient has T. R. Came from Otisville with suspicious mas-toid. Large oedema. Large tender glands cervical. Canal was occluded by oedema. Lost 20 lbs. in weight when here. Dec. 5, 1913 to Jan. 5, 1914. Aural condition and glands completely cured.
46	T. A.	M	11	Floor and anterior.	R	2 Weeks	None	Yes	Some	4	250 to 500	Cure	
47	T. G.	M	26	Diffuse.	R L	3 Weeks	None	R-Yes L-No	Moderate	8	300 to 750	Cure	No pain after 2d injection; thought well and stayed away 10 days; returned and received 6 more injections.
48	M. M.	F	38	Floor and O. M. P. C.	L	10 Days	Yes	Yes	Intense days	4	300 to 750	Cure	Staph. A. & A.
49	F. J.	M	50	Floor and anterior, much oedema.	L	2 Weeks	None	No	Intense, no sleep	4	300 to 750	Cure	All pain and surrounding oedema gone after 3d injection.
50	J. McK.	M	6	O. M. P. C.	R	1 Year	8 Months	Yes	No	8	200 to 500		Right ear has slight discharge at present.
51	A. O.	F	23	Mastoid & O. M. P. C. Diffuse.	L L	2 Years 4 Weeks	Op. no cure Incised 3 times in 4 weeks N. G.	Yes Slight	No Much	9 4	250 to 750	Cure	Left ear is dry.
52	H. J.	F	20	Diffuse.	L	3 Weeks	None	No	Much	2	350 to 500		Did not return. Professional driver with traveling audience. Canal was nearly well at two visits.

	A. N.	F	34	Floor.	L	2 Days	None	No	Severe	3	250 to 500	Cure	
53	S. B.	M	24	O. M. P. C.	L	20 Years	Treated in Europe years; no benefit	Much	Slight	2s	250		Autogenous Staph. aureus.
54	H. P.	M	17	Floor and anterior.	R	2 Weeks	None	No	Slight	7a 2	750 to 250	Cure	
55	A. B.	F	8	O. M. P. C.	R.L	7 Years	Everything	Yes	No	4	400 to 250	Cure	
56	E. S.	F	45	Floor and post.	R	8 Days	None	Yes	No	4	500 to 250	Cure	
57	J. C.	M	4½	Diffuse.	R	2 Days	None	No	Yes	2	500 to 250	Cure	
58	E. G.	F	2	Diffuse.	L	4 Days	Argol 50%; no improvement	No	Much	2s 4a	300 to 750	Cure	The oedema of side of head was so great patient was sent to hospital for a mastoid operation.
59	B. S.	F	17	Diffuse canal occluded.	R	6 Days	None	Yes	Severe	6	250 to 750	Cure	
60	A. S.	F	22	Floor.	R	2 Weeks	None	Yes	Moderate	6	750 to 250	Cure	
61	M. O.	M	30	O. M. P. A. Perichondritis Furuncle	L	4 Days	Drum incised, perichondritis followed, furuncle next	Yes	Great	1s 10a	400 to 750	Cure	Autogenous Staph. Aureus.
62	L. M.	F	18	Floor.	R	3 Days	None	No	Slight	4	250 to 450	Cure	
63	G. M.	F	20	Diffuse.	R	9 Days	Incised else-where 40 days before; N. G.	Yes	Moderate	4	300 to 500	Cure	
64	N. M.	F	50	Canal occul.	L	4 Weeks	Incised 3 weeks before, worse	Yes	Great	6s	300 to 750	Cure	Improved slowly with stock. Autog. Staph. A. & A. mixed.
65	M. Z.	F	40	Anterior.	L	4 Weeks	Incised 3 weeks ago, no improvement	Yes	Yes	3a 1s	750 to 300	Cure	After 2d Autog. Staph. A. & A. looked as though never sore.
66	B. R.	F	25	Floor and anterior.	L	6 Days	None	No	Yes	4a 3	750 to 250	Cure	
67	V. B.	M	32	Floor and anterior wall.	R	14 Days	Local	Yes	Yes	1s	500 to 300	Cure	Autogenous Staph. patient looked as though a parotitis was beginning—all cleaned up.
68	R. L.	F	38	Circ.	L	2 Weeks	Lanced 10 days ago	Yes	Severe	4a 6	750 to 500	Cured	Furuncle cured after 4 injections. A mass of granulations protruded from the incision; all gone after 6 injections. No drum left in ear.
69	M. D.	M	8	O. M. P. C.	L	3 Weeks	None	Much	No	4s	250 to 500	Cured	
70	J. M.	M	10	O. M. P. C. after Mastoid 1 year ago.	L	9 Years	Everything, operation	Much	No	3s	250 to 600	Cured	After mastoid operation ear discharged as much as before.
71	M. F.	M	30	Circ.	L	2 Weeks	No	Yes	Yes	4a 5	600 to 250	Cured	
72	M. O'C.	F	38	Drif.	L	1 Week	Iodine	Much	No	3	500 to 250	Cured	This furuncle had not ruptured, but completely occluded meatus and was angry in appearance.
73	F. B.	M	6	Drif.	6	2 Weeks	No	Yes	Much	3	250 to 500	Cured	The canal was closed by a large bladder of fluid, all subsided.
74	A. L.	F	13	Drif.	13	1 Week	No	Much	No	5	250 to 500	Cured	

far as a good result on the lesion is concerned, but in the use of vaccine therapy it is just as important to establish a correct and definite diagnosis, if a good result is to be secured, as it is to be sure of one's diagnosis before beginning treatment of a heart or kidney lesion. Every man and every laboratory does not do this. For the successful treatment of these infected conditions of auditory apparatus, one must first know *what organism is doing the damage*, not only as regards the morphology, by aid of the microscope, but by a thorough study of a culture, and even if found necessary, by animal experimentation as well. In other words, a correct diagnosis must be made. It is not necessary in every case to employ every step of the process, just specified—for in some cases the condition is self-evident. The technic used by us is as follows:

The auditory canal is first irrigated thoroughly with boric acid or saline solution, or wiped clean with cotton, and then the canal is plugged with cotton impregnated with 95 per cent. alcohol, which is allowed to remain in situ for about fifteen minutes. The cotton plug is then removed and with the aid of a Siegel otoscope the pus is aspirated through the perforation. In this way the possibility of getting pure cultures is greatly aided. One avoids contamination from air organisms. Streak plates are then made on blood agar and ascitic fluid agar with the platinum needle or loop, and incubated for twenty-four hours, after which the colonies are fished and recovered on slant agar, or, as is more often the case, with us, on Dorset's egg media, to which a little ascitic fluid has been added. The vaccines are then prepared in the usual way from the pure cultures.

In dealing with furuncle cases, we can often recover direct on egg media or agar, without preliminary plating and fishing, as there is not so much likelihood here of contamination. But in the case of subacute and chronic otitis, we have found it necessary to carry out the above technic. The organisms are identified by all the means at our command, as morphology alone is quite untrustworthy in some cases. This identification by culture, and if necessary by agglutination tests, etc., takes some days, but we have been in the habit of making up the vaccines at once, and using them if organisms are found that are killed by a heat at 55° C. to 60° C. in one hour.

The process just described takes usually two days, and in order that no time be lost in attacking the disease, we give an initial dose of a pure staphylococcus aureus or albus culture. This is not the stock vaccine of the market, which is made of mixtures of different strains of bacteria of the same or

allied species, and is of uncertain strength and efficacy, but a vaccine made in our own laboratory from at least twenty to thirty strains of staphylococcus aureus, albus, or citreus, isolated at various times from a number of patients who are all suffering from a similar condition, and strains that have been freshly isolated.

When the patient returns for the next treatment the morphological classification has been determined as well as the cultural diagnosis made in the majority of cases. If we find that the infecting organism is one of those specified above, and corresponds to the organism of the vaccine used in the first treatment, and if there has been an alleviation of the symptoms and an improvement in the general condition of the ear, we generally continue giving the "home-made" stock vaccine. If, however, the organism is of a different type, an autogenous vaccine is ready for use for this, the second treatment. In some cases where the progress of the case has not been satisfactory enough to satisfy, under the use of our own "home-made" stock vaccine, an immediate beneficial effect has been obtained when the autogenous vaccine has been substituted. In brief: a scientific diagnosis is made with as much or even more care than is the usual physical diagnosis of disease, and it is to this fact that I attribute the success in the following fairly comprehensive series of 75 cases, with no failure to report.

Why all this care in diagnosis and the selection of vaccine?

Because the function of the vaccine is to stimulate the system to form antibodies and opsonins which combat the disease, and inasmuch as it has been shown that a certain bacterium will produce a certain antibody or a certain opsonin, and that that antibody or opsonin will be effective against that bacterium and against that alone, it is evident that the vaccine used must contain an antigen the same as the offending organism, otherwise no antibodies or opsonins will be formed and no result will be obtained, unless it may be a possible weakening of the system of the patient.

40 EAST 41ST STREET.

It is surprising how much information can be derived by abdominal palpation conducted with the patient in a hot bath, the temperature of the water being gradually raised to 105° F. It usually secures as much relaxation as does the administration of an anesthetic, sometimes even more. In addition to the avoidance of the dangers and the disagreeable features of narcosis, it has the important advantage that the patient is able to call the examiner's attention to sensitive areas.



## LATENT MASTOIDITIS.

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The title of this paper was suggested to me by two cases of mastoiditis seen within the past few months, in which many of the symptoms usually evident in acute mastoiditis subsided, and in which an operation was justified because of the long continued and profuse discharge.

As a rule conservatism in surgery of the mastoid is of prime importance, and in many cases when acute symptoms have been present, the patients have recovered without any operation being performed. However, a surgeon must use a certain amount of circumspection and should not prognosticate too favorably upon a case until he is absolutely sure that it will clear up within a reasonable length of time. The two following cases will illustrate this point:

CASE I:—Mr. K. developed an acute suppurative otitis media in his right ear the latter part of August, 1913. The ear drum was incised on the second day by another otologist. For a period of ten days the patient was in bed suffering from a profuse discharge from the ear, temperature ranging from 100° to 101°, pain over the mastoid, and headaches. The fever subsided, but the discharge remained profuse. At the end of two weeks he came to see me, complaining of the discharge from his ear, with a slight parietal headache, dizziness, and tinnitus. Examination of the ear after proper cleansing showed a sagging of the postero-superior portion of the drum, and pulsation of a small opening in the drum from which there was a profuse discharge of thick tenacious pus. He complained of no pain over the mastoid, nor was there the least tenderness over any portion of it.

On account of the profuse discharge and the evidences shown by the drum, I told him that he had mastoiditis, which might possibly clear up.

I saw him almost daily for the next three weeks, during which time there were no fever, no pain, and no headache. The patient slept well, and was going about his business. During this time I opened the drum more widely on two different occasions, but the discharge still continued to be as profuse as ever. Feeling that things were not getting any better and probably at any time they might become worse, I advised opening the mastoid. Naturally I was not surprised when he disagreed with me about this procedure, but to overcome any doubts on his part x-ray pictures of both mastoids were taken by Dr. George S. Dixon of the New York Eye and Ear Infirmary. The radiogram of the right mastoid indicated a complete destruction of the whole bone extending backwards beyond the sinus and down into the tip. On operating two days later the entire mastoid cavity was found filled with pus (strepto-

coccus). It was completely exenterated and the wound closed up, all except the lower angle, as described by me in the AMERICAN JOURNAL OF SURGERY, June, 1911. The patient was an uneventful recovery, leaving the hospital at the end of twelve days. Some of the hearing has returned, but it is still impaired, due to a great extent to his negligence in having the ear properly massaged.

CASE II:—In February of this year I was called upon to treat a young woman suffering with a severe pain in her ear. I found a bulging drum which I opened immediately. There was a profuse discharge of serum, which the following day became purulent. For the following week, during which time she was at the New York Eye and Ear Infirmary, the discharge continued profuse, her temperature ranged between 100° and 101°, and there was acute tenderness over the whole mastoid. When she left the hospital at the end of a week her temperature was normal, she had no pain or headache, slept well, and had no symptoms except the discharge from her ear. I treated her conservatively during the next two weeks, but at no time was there any subsidence of the discharge. On deep pressure a slight amount of tenderness could be ascertained over the region of the antrum. The drum showed a slight amount of sagging of the postero-superior wall.

After three weeks I deemed it advisable to open the mastoid, and was not surprised to find the entire cavity filled with pus and granulations. The mastoid was thoroughly cleaned out and the wound closed except a wick drain at the lower angle, which was removed on the second day. The patient made an uneventful recovery, and left the hospital at the end of seven days.

These two cases clearly indicate that there are many cases of mastoiditis which do not go on to resolution and cure, although the main symptoms entirely disappear. I do not believe that one does any harm in waiting provided the case can be watched daily, so that one may note whether any unusual symptoms develop. Apparently, there are certain mastoids which have an anatomical arrangement that permits of a through drainage of the very deep cells by intercommunication channels. Very often in these cases the underlying bone tissue forming the base of the mastoid is very dense, so that at no time are dangerous parts exposed.

There are two signs that indicate the progress of the disease, and which make it apparent that sooner or later an operation will have to be done. These two signs are a profuse discharge of pus which does not show a tendency to subside, and a sagging of the postero-superior quadrant of the drum.

Apparently, one does little harm in waiting for a considerable length of time before he operates upon these cases, even when the infection is due to such virulent organism as the streptococcus mucosus. It is my belief that as time goes on the patient

devolps a certain amount of resistance to the infecting organism, or else the organisms lose some of their virulence. Apparently, the discharge is kept up by the inflammatory reaction within the mastoid cells, which cannot be properly cleaned out, plus the continuous application of low-grade infecting bacteria. In no other way can I account for the unusual success attained in closing up these wounds after so much infection has taken place for so long a time, and getting them to heal by primary intention.

Latent mastoiditis is a condition which possibly is met with very often. I believe that frequently after the acute symptoms have subsided we often have to deal with a pus cavity in the mastoid, which sooner or later must be attended to, unless we wish the infection to go on to some complicating condition that will necessitate a far more radical measure.

11 WEST 81ST STREET.

### PERIRENAL HYDRONEPHROSIS, PSEUDO- OR SUBCAPSULAR HYDRO- NEPHROSIS.

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When the urinary secretion finds its way under the fibrous capsule of the kidney, and dissects this away from the surface of the organ so that a pseudo-cyst is formed, we have the condition which has received various names, the most descriptive being *perirenal hydronephrosis*, *pseudo-hydronephrosis*, and *subcapsular hydronephrosis*. So little has been written concerning the pathology of this lesion, and the reported cases in the literature are so few in number, that it may be of some interest to report two cases that have come under my own observation.

Albarran, in his book,\* describes this condition under the caption uronephrosis, regarding as subcapsular uronephrosis that form in which fluid accumulates under the capsule of the kidney. In these cases, he says, there is usually an orifice of communication between the kidney pelvis and the perirenal pocket.

Kaufmann, in his book on Pathology,\*\* speaking of hydronephrosis, refers to two varieties of fluid accumulation outside of the kidney: pararenal hydronephrosis and perirenal hydronephrosis, the fluid

accumulations being under the fatty capsule in the former, and under the fibrous capsule in the latter type.

Babitzki,§ in an exhaustive review of the literature, concludes that these cases are rare, for he could find only twenty-two in the literature. His own case may be briefly cited, for it is typical of the condition:

In a patient 36 years of age, who gave symptoms of pain in the left flank, a large tumor developed two weeks before admission to the hospital. This tumor was fluctuating, apparently retro-peritoneal, and was diagnosticated as probably involving the kidney. No urine could be obtained from the left side upon cystoscopy and ureteral catheterization. Nor did the indigo-carmin show any function on that side. Upon operation, a large cystic tumor was found which contained chocolate-colored fluid, and at the bottom of the cyst the surface of the kidney could be seen. It was apparent that this cystic tumor was produced by a rupture of the renal pelvis, the escaping urine leading to the formation of a pseudo-cyst.

According to this author a diagnosis was correctly made in only two cases of those recorded in the literature. If, in a case of hydronephrosis, there should occur a sudden increase in the size of the tumor and sudden pain, we would be entitled to think of rupture, and the possible production of a subcapsular hydronephrosis, although an escape of urine outside the capsule is more probable than under it.

The first case which I wish to report is remarkable, both because of the fact that there existed a congenital obstruction to the urinary outflow in the urethral tract, in an infant nine months of age, and also because of the presence of lesions of both kidneys: an infantile undeveloped kidney associated with a hydronephrotic kidney and subcapsular urinary exudation. Inasmuch as only the pathological aspect of his case was personally observed, I am indebted for the following brief excerpt of the history to notes taken on Dr. Gerster's service.

I. G., aged nine months, admitted to the Mount Sinai Hospital (service of Dr. Gerster), December 23, 1907, was reported to have had a great deal of trouble with urination for at least three months. The baby cried during each act of micturition and seemed to strain a great deal. For about a week an enlargement of the right half of the abdomen had been noticed.

On admission to the hospital, the child appeared to be fairly well nourished, but a mass extending

\*Médicine Opératoire des Voies Urinaires, Paris, 1910.

\*\*Spezielle Pathologische Anatomie, Berlin, 1909.

§Archiv. f. Klin. Chir., 1912, vol. XCVII., p. 993.

from the free border of the ribs down to Poupart's ligament could be felt on palpation.

Nephrectomy was decided upon and a large subcapsular exudation around the hydronephrotic kidney was revealed. Death occurred, the autopsy showing an insufficient, infantile, and hydronephrotic organ.

*Pathological examination.* Lying in a somewhat thickened capsule, large enough to contain a body as large as a grapefruit (Fig. 1), is a small kidney. The sac is empty, its contents—clear straw colored fluid—have escaped at the time of operation. The intrarenal portion of the pelvis of the kidney is considerably dilated, and the parenchyma correspondingly diminished in volume.

The capsule is everywhere detached from the surface of the kidney and here and there presents



Fig. 1.

whitened and thickened areas, some covered with fibrinous deposit. About the middle of one surface of the kidney, and about 1 c.m. from the convex border, there is an irregularly circular opening about 8 m.m. in diameter. This establishes a communication between the pelvis and the subcapsular cavity.

More suggestive and enlightening as regards the causation of these subcapsular exudates is the history of the second case in which the rôle of traumatism was very evident.

H. T., 14 years of age, was admitted to the Har Moriah Hospital, October 25, 1913, with the history of having experienced a severe blow in the left upper abdomen and back some five years previously, followed by pains in the left loin and vomiting. At this time there was no blood in the urine, nor do his parents remember that he had any urinary trouble.

For the past five years he has had attacks sim-

ilar to the above, recurring at intervals of two or three months. About six months ago he fell and struck the left side, after which a severe attack of lumbar pain followed, associated with vomiting. At this time blood appeared in the urine. Pain and vomiting were features of all the attacks.

On October 28, there was a severe attack of pain in the left lumbar region and the urine contained many pus cells and red blood cells.

On October 29, left lumbar nephrectomy was done through the usual Albarran oblique lumbar incision. A cystic tumor about the size of a small coconut was exposed. The walls of the cyst were liberated in the usual fashion, but the mass could not be completely freed without rupture. After the escape of about 8 ounces of bloody urinous fluid, it became apparent that the fluid represented an exudate lying between the capsule of the kidney and

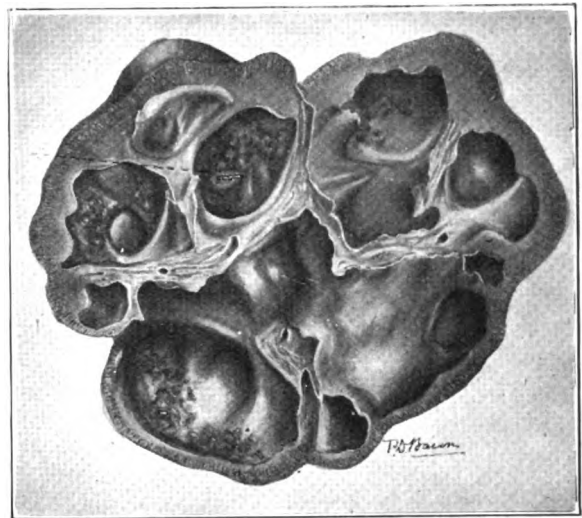


Fig. 2.

the kidney itself. The kidney was extirpated in the usual manner and the wound closed, a small tube being placed in as a drain.

The patient made an uneventful recovery; sutures were removed after a week, and after two weeks the patient was discharged with the wound closed.

We were evidently dealing here with a case of traumatic rupture of a hydronephrotic kidney with the production of a subcapsular exudate of considerable size.

*Pathological examination of the kidney.* The organ is about one-half again as large as a normal adult kidney (Fig. 2), presenting the typical picture of hydronephrosis of the renal type. The parenchyma is markedly attenuated, being reduced to the thickness of parchment in many places. In its thickest parts it measures no more than 5-7 m.m. Somewhat above the middle of the anterior surface

there is a rent in one of the most prominent sacculations. This hole is ragged, some 6 m.m. in length and its margins are covered with shred-like coaguli. There seems to be no doubt but that the escape of urine under the capsule had taken place through this hole. There is a number of other places where the substance of the kidney is so thin as to be distinctly translucent.

The features presented by our two cases may be briefly summarized as follows: In both instances there was a hydronephrosis with marked attenuation of the renal parenchyma; in one case a distinct history of traumatism could be elicited; and in neither case were the clinical data sufficient to arouse even a suspicion of the exact anatomical lesion.

#### FIVE HUNDRED CASES OF OIL-ETHER COLONIC ANESTHESIA.

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*History.*—The first public demonstration of ether as an anesthetic was given by Morton in the Massachusetts General Hospital in Boston, October 17, 1846. One year after this, rectal injection of fluid ether was verbally discussed by Roux before a meeting of the Académie des Sciences in Paris. This idea was actually carried out by Dupuy,<sup>1</sup> experimenting with dogs and rabbits. It was also mentioned in the same year (1847) by Pirogoff,<sup>2</sup> in St. Petersburg. His idea was to introduce liquid ether, but upon the advice of Magendie he devised a method of vaporizing the ether by means of heat and allowing it to pass into the intestine by the expansive pressure thus generated. Pirogoff reported eighty-one cases, with two deaths. Although he was very optimistic, thinking that this procedure might supplant inhalation methods, the results evidently did not warrant its continuance, as we read no more of it in the literature of the time.

In 1884, thirty-seven years after this first attempt, Mollière<sup>3</sup> again revived the identical procedure, which was tried and reported upon in this country by Bull,<sup>4</sup> Wier,<sup>5</sup> Wancher,<sup>6</sup> and Post.<sup>7</sup> But because some cases were followed by marked diarrhea and melena and one death was directly traceable to the method, it was abandoned.

In 1904, Cunningham,<sup>8</sup> of Boston, again revived rectal anesthesia, but with the radical difference of using air as a vehicle for the ether, instead of heating it. This was followed by such good results that it was taken up by Leggett,<sup>9</sup> Sutton,<sup>10</sup> and others. Sutton reported 140 personally conducted cases, with no deaths and no untoward after-effects. He

devised probably the best apparatus for administering ether in this manner. The distinctive features of his apparatus consist in having a mercurial manometer that automatically blows off at 20 mm. pressure, a generator for mixing oxygen and ether in nearly exact proportions, and tubes for conveying this mixture to and from the body.

Although very good results were obtained by Sutton in Roosevelt Hospital, under the guidance and supervision of Brewer—the operating surgeon who was also enthusiastic about the method—others did not have as good results, and the procedure again lapsed into disuse. There was no special reason for the abandonment of this ether vapor rectal anesthesia except that an extensive and somewhat complicated apparatus was required.

On August 6, 1913, I read a paper on "Oil-Ether Anesthesia" at the Seventeenth International Medical Congress in London.<sup>11</sup> The first successful clinical demonstration with oil-ether was on September 27, 1913, at The People's Hospital, New York City, upon a patient of Dr. I. M. Rothenberg, Dr. S. Rothenberg operating. This work was continued at Columbus Hospital, and was successfully demonstrated at other hospitals in New York City, then in neighboring cities, and the method is now being used with success in different parts of the country.

*Animal Experiments.*—Between twenty and thirty animals were used in experiments, and in only one instance did we lose an animal as the direct result of the anesthetic, and this was intentional. In succeeding experiments, before the dosage was determined, several animals were rescued from the danger zone by simply washing out the rectum. Autopsies were performed at irregular intervals upon others, and no contra-indication to the method was found. Although considerably handicapped by the short and small rectum of the dog, we persisted in these experiments until we obtained a perfect anesthesia in several successive cases.

*Laboratory Work.*—Experimental work with animals under the direction of Professor Wallace, and the laboratory work of Professor Baskerville, to determine the time of the separation of the ether from the oil has been reported. (See Bibliography, 12 to 14.) Wm. H. Park, Director of the Bureau of Laboratories of the Department of Health of New York City, states that the colon bacillus is killed in one minute by a 75 per cent. solution of ether in olive oil, the amount used with adults. A 50 per cent. solution kills the colon bacillus in ten minutes. As infection from the

colon bacillus is to be reckoned with in many surgical operations, it may be inferred from the above that the employment of oil-ether colonic anesthesia would be an additional element of safety.

*Physiology*.—It must be very clearly understood that the physiology of oil-ether anesthesia is entirely different from that of ether when introduced by the respiratory route. When the oil-ether mixture is introduced into the rectum, it requires a very short time to heat the mixture from room to body temperature. When this occurs, some of the ether leaves the oil in the form of a gas. It is then absorbed by the blood circulating in the small capillaries surrounding the colon. It is carried thence through the liver by the greater circulation and on to the heart, and from there it is pumped into the lungs. By the time the anesthetic has reached the lungs it is thoroughly warmed to the body temperature. There is no irritation to the lungs, and mucus and saliva accumulations are usually absent; when these are present, the amount is so small that it is a negligible factor in the anesthesia. The ether is exhaled and some of it is reabsorbed, some of the gas, however, escaping through the air passages to the outer air. The odor of ether is perceptible on the patient's breath in three to four minutes. When this reabsorption occurs, the anesthetic is distributed throughout the circulation, as in inhalation anesthesia, and so reaches the central nervous system. It may be noted in passing that both the rectal and the intravenous methods of anesthesia prove the value of warm anesthetics.

Breathing, with this form of anesthesia is perfectly normal. If stertor commences, it indicates unnecessary deepening of the anesthesia. If cyanosis is present, it is evidence of an over-dose of the anesthetic or of an imperfect airway. The reflexes are quite active, especially the lid reflex; at the same time, a very great degree of relaxation exists throughout the whole muscular system. The pulse rate depends upon the preliminary medication. If chlorotone and morphine have been given, the pulse is about normal; otherwise, it will be a little faster and very full and bounding. The face is not usually flushed, as often occurs with ether inhalation. Consciousness seems to be regained long before the sensations of pain are manifested. Chlorotone and morphine probably account for some part of these phenomena.

Four factors tend to maintain automatically the depth of anesthesia: (1) The rate of evaporation of ether from the oil, which is always constant in normal individuals. If a body temperature of over

100° is present, a smaller amount of the mixture is required. (2) The distension of the colon. Sutton discovered that when the colon is fully distended not so much ether is absorbed as when it is only partially distended. (3) As the ether leaves the mixture, both the mixture and the gut are cooled off by the process. This retards both elimination and absorption. This process, however, does not affect the temperature of the patient, which remains constant. (4) The fourth factor is the difference between the absorptive power of the colon and the eliminative capacity of the lungs. But for the residual air in the lungs, it would be impossible to maintain anesthesia by this method.

That these four factors acting harmoniously produce as even a plane of anesthesia as can possibly be maintained by any other method, is demonstrated by the following data:

(1) A patient was partially anesthetized at eleven A. M. by administering four ounces of a 75 per cent. mixture, with the idea that within fifteen minutes a sufficient amount would be added to produce surgical anesthesia. Both the anesthetist and the surgeon, however, were detained upon another case, and did not arrive at the hospital until two P. M. During this entire time the patient was in the second stage of anesthesia. Upon the addition of the proper amount, surgical anesthesia was immediately attained, and an operation lasting about forty minutes was performed.

(2) Another patient was anesthetized, but with less than the amount required. Four drops of chloroform upon a mask completed the anesthesia, but it was necessary to add two to four drops of chloroform every five minutes throughout the operation, which lasted over an hour and a half. Upon the withdrawal of the chloroform, the patient immediately resumed the second stage of anesthesia produced by the oil-ether administered before the beginning of the operation. Upon irrigating the lower bowel with cold water and siphoning off the residual oil-ether, the patient became conscious, as in a gas-oxygen narcosis. She was fully conscious when returned to bed.

(3) In many hundreds of cases surgically anesthetized by this method (in which no supplementary anesthetic was employed), the pulse, respiration, reflexes, and blood pressure all remained constant.

*Safety*.—The limits of safety are wider than with any other known method, as shown by the difference between the dosages for surgical narcosis and for toxemia. The fact that it requires from ten to twenty minutes for the anesthesia to fully

assert itself would also indicate that an equal time would be given if any untoward symptoms should present themselves, and this is exactly what occurs. The factor of safety may be illustrated by citing one case in which a near-fatality resulted.

The case occurred in the Harlem Hospital. The patient was a woman weighing less than one hundred pounds, who received an overdose of both the preliminary medication and the mixture. Twenty grains of chloretone and eight ounces of a 75 per cent. mixture were administered, whereas the proper dosage for such an individual is five grains of chloretone and five ounces of a 75 per cent. mixture. She received four times the required amount of preliminary medication, and two-thirds more of the mixture than was necessary. The result was a respiratory arrest of eight minutes, but upon instituting the usual restorative measures she made an uneventful recovery.

*Apparatus Required:*—The only apparatus required is a rectal tube one-fourth of an inch in diameter and about twenty-eight inches long—the ordinary tube being too short—a clamp for this tube, a three-inch glass funnel, and a Lockwood tube about thirty inches long and three-eighths of an inch in diameter. These should be sterilized before use.

*Improvements in Technic:*—The technic has been considerably improved since the first report. One to two ounces of castor oil should be administered to the patient the night preceding the operation, care being taken to avoid purging. In the morning, irrigate until the return is clear, and allow the patient to rest for two hours or more.

*Preliminary Medication:*—No preliminary medication is required for children under nine years of age, but in order to obtain the most satisfactory results with adults, preliminary medication is essential. My own preference is to give per rectum—one hour before the time of operation—five to twenty grains of chloretone in a suppository, or dissolved in two to four drams of ether to which an equal amount of olive oil has been added. As paraldehyde mixes perfectly with oil and ether in all proportions, it may be found that two to four drams of this fluid dissolved in an equal amount of olive oil and given alone—is preferable as a preliminary. As isopral, like chloretone, has a slight local analgesic as well as a general hypnotic effect, this drug may be superior as a preliminary to the others mentioned. One-eighth to one-quarter of a grain of morphine, with one one-hundredth of a grain of atropine should be given hypodermically fifteen minutes after the

chloretone or paraldehyde has been given.

For alcoholics and athletics, the following is suggested: Two hours before operation, give one one-hundredth of a grain of hyoscin hydrobromide hypodermatically, and one hour before the operation repeat the hyoscin with one-quarter of a grain of morphine. For these subjects, Sutton gives one-sixth to one-quarter of a grain of morphine, and 1/120 to 1/100 grain of scopolamine, hypodermatically, one hour before operation. With both the preliminary medication and the mixture, the patient should be in the Sims' position. If in a ward, the bed should be screened. No unnecessary exposure of the patient should be tolerated. At least twenty minutes before the time appointed for the operation, the 75 per cent ether-oil mixture should be administered very slowly through a catheter to which is attached a funnel, the end of the catheter having been well lubricated and inserted four inches within the rectum—allowing one minute for each ounce given. The patient will become unconscious in about five minutes, but full surgical narcosis is not usually reached before ten to thirty minutes. The time of narcosis is shortened by keeping the patient perfectly quiet and not allowing him to talk.

From a large number of cases, we have deduced the rule of one ounce of a 75 per cent mixture of ether in oil for every twenty pounds of body weight. For children, a mixture containing 50 to 65 per cent of ether is sufficiently strong. Thus we see that, according to the rule stated, an adult weighing one hundred and sixty pounds will require eight ounces of a 75 per cent mixture. No more than eight ounces should ever be given, regardless of the patient's weight. If a patient is too lightly anesthetized by this amount, it is better to supplement by inhalation than to increase the amount to ten or twelve ounces. In my own practice, two patients, women weighing 240 and 250 pounds respectively, were fully and deeply anesthetized with this amount of the mixture. A wiry, athletic, alcoholic subject, weighing 150 pounds would also take about the same amount. A child four to six years of age, would probably require just a little more than the one ounce for every twenty pounds of body weight. We run no risk with children, because the rate of absorption is much more rapid than with adults, so we can always proceed slowly with the introduction of the mixture. One-half to one ounce can be added later, if necessary.

From this time on, the patient should not be left alone. In ten to thirty minutes, the patient will

be ready to be placed upon a stretcher and carried to the operating room. If cyanosis, loss of reflexes or embarrassed respiration occurs, two or three ounces of the mixture should be withdrawn, and irrigation with water should be instituted and maintained until the anesthesia is satisfactory. If the breathing is easy and regular, with the reflexes active, the patient will be found to be relaxed and in surgical narcosis. If the patient is lightly under the influence of the anesthetic at this time, a towel placed over the mouth and nose will deepen the anesthesia. The lower jaw should be manipulated as in inhalation anesthesia, in order to maintain a clear airway. A Connell breathing tube should be employed if stertor or cyanosis begins.

When the operation is completed, the two rectal tubes should be placed in position and the colon gently massaged from right to left, in order to withdraw any of the mixture that remains. The bowels should then be thoroughly irrigated by one or two gallons of cold soapy water introduced through the funnel attached to one of the tubes and allowed to pass out through the other. One of the tubes should then be withdrawn, and two to four ounces of olive oil, followed by a pint or a quart of cold water, should be injected into the colon, and the remaining tube withdrawn. The reflexes should be quite active and the patient breathing quietly as he is returned to bed. The patient usually awakens in ten to fifty minutes, quietly, without nausea, vomiting, or pain, the analgesia continuing for some time after consciousness is restored.

*Value as Compared with Other Methods:*—Sutton kept careful records of one hundred cases of rectal etherization in Roosevelt Hospital. A comparison with these cases is important in order to determine the status of oil-ether. Sutton's cases "ranged from two to seventy-seven years in age. The longest time of operation was two hours and twenty minutes, the average being fifty-three minutes. Eighty-seven grammes of ether per hour was the average consumption. Forty-three patients had a supplementary administration of ether or chloroform; twelve cases had eructation of gas, probably indicating the passage of air into the stomach from the distended small intestine. After the adoption of a 20 mm. maximum pressure in the bowel, only four cases in seventy-one were so affected. In eighteen cases there was slight perspiration; forty-three patients vomited after the operation, several of these having no sensation of nausea; twelve had abdominal pains; five had bloody stools or blood-streaked re-

turns from the post-anesthetic enemata—all cleared up in the course of a few hours to three days."

Sutton's conclusions are: "(1) That the method is one of extreme safety in the absence of definite intestinal lesions; (2) the colonic method of administration of ether is more complex than the pulmonary method in general, and requires from the anesthetist a broader appreciation of the physiological factors involved. For these reasons alone, its field of usefulness is limited to cases in which it presents distinct advantages over the pulmonary method. It is, therefore, not a method adapted to the experimental use of the tyro, but, rather, a valuable addition to the armamentarium of the trained anesthetist."

It is probable that oil-ether anesthesia has been administered a greater number of times during the short period since its first introduction than has vapor rectal etherization during the entire period which has elapsed since 1904. This is not due entirely to the simple apparatus required, but also to the fact that it is much safer. This statement is proved by a comparison with Sutton's statistics. In not a single case has there been eructation of gas. This would indicate that on account of the physiological factors already mentioned the pressure is never as high as 20 mm. There is not a single instance of bloody stools or blood-streaked returns reported, in spite of the fact that the method is being so largely employed by those who have not been specially trained as anesthetists. In not a single instance of either children or adults has colitis or any other disturbance resulted from the anesthetic when the patient has been in fair condition. Not a single death has been reported as the direct result of the anesthesia.

One of the greatest advantages of this method is that it can be administered to the patients in bed, and they need not necessarily know that they are taking an anesthetic. The element of apprehension and fear that usually arises in the mind of every individual when told either to walk to the operating room or get on a carriage and be carried to the anesthetizing room, is entirely eliminated. Much needless mental suffering is thus avoided. The patients go into full surgical anesthesia without any unpleasant sensations, and usually waken in the same way. Even with athletes and alcoholics, the second stage is negligible. In an ideal case, the relaxation is perfect, and is more complete than with any other known method of anesthesia.

In spinal analgesia, the anesthetist is committed to the amount injected; whereas with oil-ether



anesthesia the anesthetic is as completely under control as with inhalation methods.

The cases of oil-ether anesthesia concerning which definite information have been received, are as follows:

	Number
New York Post-Graduate Hospital, reported by Dr. Heyd, January 12, 1914	50
New York Post-Graduate Hospital, reported by Dr. Frazier .....	17
People's Hospital, reported by Dr. Robinson .....	20
Columbus Hospital .....	37
Smith Infirmary, reported by Dr. Wiltsie	75
Dr. E. M. Foote .....	22
Dr. Meeker .....	14
Dr. Hubert Arrowsmith, Brooklyn Eye & Ear Hospital .....	50
Dr. Lombard .....	62
Dr. Cantle, March 20, 1914 .....	24
Dr. J. T. Gwathmey (estimated) .....	140
	511

*Comments of Others:*—"The principal case of interest at The People's Hospital was a woman weighing about 75 pounds, with a temperature of 104 degrees, suffering from general diffuse peritonitis. This patient was held on three and a half ounces of a 75 per cent mixture for an hour and fifteen minutes. She made an uneventful recovery."

"In the fifty cases reported from the Post-Graduate Hospital, 8 were supplemented with chloroform. A trace of albumin was found in the urine about as often as when the inhalation is employed. There did not seem to be an indication to proctoscope any of the patients. In only three cases was there post-operative nausea and vomiting." Dr. Heyd's conclusion is that "where we had plenty of time to give the anesthetic properly, the results have been most satisfactory."

Not included in this list was a private case which also occurred at the Post-Graduate Hospital. The patient was a doctor's wife who had delayed having her tonsils removed for over a year, on account of very great fear of the anesthetic. This new form of anesthesia so appealed to her that she immediately decided upon an operation. The anesthetic was given to her in bed, without any complaint whatsoever, and the operation was entirely successful. However, a haemorrhoidal condition was made so much worse from the anesthetic that she had to be operated upon a few days later for this condition.

At the Smith Infirmary, a supplementary anesthetic was required in one-third of the cases. The

urine was negative as to pathological findings. Those who had been operated upon previously with an inhalation anesthetic expressed a strong preference for the oil-ether method. Many patients thought they were receiving an ordinary enema, and upon awaking after the operation asked when they were to be operated upon.

Dr. E. M. Foote states: "My general impression of oil-ether rectal anesthesia is so favorable that I shall continue its use,"

Ten of Dr. Arrowsmith's cases were esophagoscopies. He reports the method as ideal for such cases.

Dr. Lombard states that in his series of cases the kidneys were less disturbed than by ordinary methods; that it is more satisfactory with children than with adults; and that it was more satisfactory with women than with men.

In two emergency cases of Dr. Meeker's (children), no preliminary preparation of any kind was given, yet the anesthesia was entirely satisfactory.

Five of Dr. Cantle's patients had taken ether before, and all agreed that this was the more comfortable method, the preliminary sensation of choking and suffocation being entirely eliminated and there being no unpleasant after-effects. All patients made good recoveries, with no complications.

Dr. John B. Murphy writes that he has used the method once. He states that the anesthesia was perfect and that he intends to make frequent use of it in his clinic hereafter.

In a private case, in my own practice—the patient being an insane woman—the mixture was placed in the hands of a nurse who gave it to the patient as she was lying on a sofa. This case also was ideal in every respect. I have the reports of several goiter cases in which no intimation of an operation was given, and the technic was carried out as outlined, with entirely satisfactory results.

My youngest case was a child two years old, satisfactorily anesthetized with a 50 per cent solution.

*After-Effects:*—The after-effects compare most favorably with the best methods of administering ether or chloroform. It has been given to consumptives, asthmatics, and to patients afflicted with bronchitis, and in no instance has the condition been made worse.

*Indications and Contra-Indications:*—It is especially indicated where the element of fear is in evidence, as in goiter cases; also with children and large athletic alcoholic men—cases in which occasionally a fatality results from fear. Large fat men and women are especially good subjects for this.

form of anesthesia. Such cases given the anesthetist much trouble with any inhalation method, on account of narrowed air passages. It is especially indicated in bronchoscopy and gastroscopy, where the anesthetist would be in the way of the surgeon. It is especially indicated in all operations upon the respiratory tract, head, neck, and chest.

**Contra-Indications:**—It is contraindicated in any pathological condition of the lower bowel, such as colitis, haemorrhoids, fistulae, etc. When these conditions exist, they are aggravated by the introduction of oil-ether. Even when no pathological condition is known to be present, if the patient should complain very much upon its introduction, rectal anaesthesia should be discontinued. Whenever ether is contra-indicated, this method should not be employed, except in bronchitis, asthma and similar conditions as previously mentioned. If, however, the patient has been ill from a previous ether administration, this is no contra-indication to oil-ether anesthesia. Emergency cases usually contra-indicate this method.

**Advantages:**—1. In administering ether by this method in bed, every principle of anoci-association, as enunciated by Crile, is fulfilled.

2. Absence of apparatus of any kind enables the anesthetist to devote his entire time to the patient.

3. An even narcosis automatically maintained.

4. Quiet natural breathing, without mucous râles.

5. Reduction of post-operative vomiting, nausea, gas pains, etc., to a negligible quantity.

6. Return to consciousness in an analgesic state.

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#### PENETRATING BRAIN TUMORS.

Occasionally brain growths penetrate the skull, but this occurs only in those which actually destroy the bone-tissue. In children, whose skulls have not yet hardened, a growth may enlarge the fontanelles and spread the sutures; and, in adults, very rarely a growth may cause local bulging of the bone.—A. S. HAMILTON in *The Journal-Lancet*.

## STRAIGHT DIRECT LARYNGOSCOPY, BRONCHOSCOPY AND ESOPHAGOSCOPY.

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BALTIMORE, MD.

(Continued from June Number.)

### CHAPTER VI.

#### TRACHEO-BRONCHOSCOPY.

##### 1. HISTORICAL.

While it is not strictly true that Killian was the first to pass a tube into the trachea, he developed the method and placed it on a working basis so that to him must be given the credit for direct tracheo-bronchoscopy. He was undoubtedly the first to invade the bronchial tubes which were "forbidden ground" to those who had been bold enough to pass tubes into the trachea. For his boldness in having opened up the bronchi to direct inspection, Killian must be given credit for one of the greatest, if not the greatest, advances in the history of laryngology. As early as 1875, Voltolini and after him Pieniazek and L. von Schroetter had inspected the trachea through tubes introduced through a tracheotomy wound. Esophagoscopists had occasionally introduced the esophagoscope into the trachea as they had found out on the withdrawal of the mandrin, but they had quickly removed the tube on discovering their mistake. Von Hacker and Rosenheim had made some observations in this region, and in 1895 Kirstein passed a straight tube through the larynx, but did not go any distance into the trachea. In 1896, Killian removed a foreign body from a bronchus through a straight tube introduced through the mouth, and in 1897 recommended the method as of practical value. Since then laryngologists throughout the world have taken up tracheo-bronchoscopy as a part of their specialty. The work, however, has never become popular to the extent that a large number of men are doing it. While many operators have reported the removal of an occasional foreign body, the more difficult cases are still referred to a few experts who have become extraordinarily skillful by long practice. In 1904, von Eicken published from Killian's clinic a series of cases which illustrated the great value of the direct methods. His article acted

as a stimulus and since the publication the number of foreign bodies removed has increased enormously. Killian described the upper and lower methods of tracheo-bronchoscopy, the former of which means the introduction of the tube through the mouth, while the latter comprehends the passage of the tube through a previous tracheotomy wound. Each of these methods has its indications and limitations which will be referred to more particularly further on.

## 2. GENERAL REMARKS.

It may be well to preface the description of the different methods of examination by some general remarks on the appearance of the trachea and bronchi as seen through the tube. It is not necessary to dilate upon the fact that the bronchoscope must be smaller than the lumen of the trachea. When the bronchoscope enters the trachea, the part to be examined is a nearly round lumen and not a flat surface as in the larynx. One sees two inches or more beyond the end of the tube and it takes some practice to tell what is before the tube. Working in the trachea and bronchi is more difficult than laryngeal work because it is harder to judge distance. Another difficult problem for the beginner is to work successfully through the small tubes which of necessity must be used. The writer has made it a rule in his dispensary work to use the smallest possible tubes because he feels that it is good practice to introduce instruments through them and to accustom the eye to seeing through the smallest possible space. This practice makes operating through the larger tubes much easier. The ease of introducing tubes into the bronchi is accounted for by the fact that the tracheo-bronchial tree can be moved, according to Brunings, at least 10 centimeters at the bifurcation and the parts immediately adjacent to it. The trachea is moved from side to side with very little force.

## 3. CHOICE OF INSTRUMENTS.

Most operators seem to prefer Brunings' instruments for tracheo-bronchoscopy. They claim that they are more easily introduced; that the light never fails, as does the Jackson light when it is covered with secretion or blood; that the lumen of the tubes is larger and therefore easier to work through. That these are strong arguments no one can deny, but the writer is convinced that the advantages are more apparent than real. The largest Jackson tube measures 9 millimeters in the inside diameter, while Brunings has one of 12 millimeters. With the writer's method of introducing the bronchoscope, a Jackson tube of 12 millimeters can be

easily passed between the vocal cords in many adults, but there is no necessity for a tube of this diameter. When successful work can be done with a smaller tube and one runs no risk of injuring the structures of the larynx with it, it is useless to use the larger tube. The objection to the source of light in the Jackson tube is not serious if atropine is given before the examination to dry up secretions and one has a second light carrier loaded to introduce if the first one becomes clouded or burns out. If one uses a battery and is careful to have the lights just at white heat, there is not much danger of burning out the light. The writer has tried both Jackson's and Brunings' tubes; he prefers the former because he is convinced that the light is better when one is working far down in the bronchi. The great advantage of the Jackson tube is that one has an open surface to work through, while with the Brunings' instrument the forceps must be introduced through the slot in the mirror. The question of instruments is, after all, of secondary consideration. The beginner should learn with one set of instruments and stick to them, for one can do the best work with implements that one is accustomed to.

## 4. CHOICE OF METHOD.

In this country, following the teachings of Jackson, the lower method is being used less and less. In European countries it is better to quote Brunings, who says: "If statistics are consulted, it will be found that in Gottstein's series the upper method was followed in 37 per cent., the lower method in 37 per cent., and the two methods in 17 per cent. of all the cases, showing that upper and lower bronchoscopy were practised equally. The proportion is rather different when the numbers are taken with regard to different ages, as I have done in the following table:

Age in Years. (1)	Lower Bronchoscopy. (2)	Upper Bronchoscopy. (3)	Upper and Lower. Bronchoscopy. (4)
0-6	% 47	% 33	% 20
7-12	32	53	15
13-60	24	52	24

It is seen that the frequency of tracheotomy after the age of six rapidly decreases, and after the twelfth year decreases still more. Of course, the cases in the fourth column (upper and lower bronchoscopy) are not included. These belong all nearly to the second column, because, as the upper method is impracticable, tracheotomy had to be performed. It must be remembered in the interpretation of these statistics that the cases in question were all of an operable character (foreign bodies), and that

peroral introduction of the tube was often contra-indicated by the gravity of the symptoms. In many cases, also, it was only after tracheotomy had been performed that endoscopic treatment took place. Nevertheless the percentage of lower bronchoscopy seems very high with the comparison with the figures in Killian's clinic, but this no doubt is due partly to imperfect mastery of the method—which was still in its trial—and partly to an incomplete set of instruments. If the early difficulties of passing the larynx with a long and narrow tube and frontal illumination are remembered, it may confidently be expected that the lower method will be largely abandoned as the new instruments are introduced. Nevertheless, lower bronchoscopy will in future continue to be practised in the case of certain indications, for it is not only technically much easier to carry out, but, in certain cases, also guarantees greater certainty and safety in endoscopic operation. In practice three main groups of such cases have to be considered:

1. The subject may already have an opening in the trachea at the time of examination.

2. Tracheotomy may promise other than endoscopic advantages.

3. The incision of the trachea may simply serve the purpose of tracheo-bronchoscopy.

In the first case, of course, the lower method of examination will be contemplated only if the purpose is something else than to study the lumen image of the trachea in the neighborhood of the tracheal opening. In the second case it is more difficult to decide, i.e., when for other reasons (laryngeal dyspnea, etc.) the question of tracheotomy has to be considered. It is only important to remember that lower tracheo-bronchoscopy is far more easily performed than the upper method (even a beginner is sure of success), but it must also be considered that even in the case of success it is possible that subsequent tracheotomy may become necessary, and this has often to be carried out with the greatest haste while the patient is exhausted and seriously affected with dyspnea. There is also the consideration that, with the lower method, anesthesia, which is dangerous in dyspneic conditions, is avoided and the patient becomes less exhausted—a circumstance which especially deserves to be remembered when an examination has to be repeated or when endoscopic treatment has to be prolonged. These considerations lead to the third case, in which tracheotomy would simply serve the purpose of the endoscopic examination or operation. By this I do not refer to the introduction of the tube, because I presuppose sufficient

skill in this matter. Even in this case tracheotomy may be clearly indicated unless, owing to severe concurrent dyspnea, an anesthetic would be necessary, or if specially difficult endoscopic operations are in question. Among these, of course, are especially difficult cases of foreign bodies, when the form and size of the foreign body makes it uncertain whether it can be passed through the larynx, or when difficulties of presentation or loosening are anticipated, or when a moving body lies in front of the trachea, or when the operation is seriously imperiled through continuous irritability or secretion. All this must especially be taken into account with children, for in their case the smallness of the parts seriously adds to the difficulty. There ought, therefore, to be no hesitation about resorting to tracheotomy when any special difficulties occur during the upper examination, or even when danger may be anticipated from cocaine or general anesthesia, as is especially the case in children, owing to the undue prolongation of the examination. For operative bronchoscopic purposes in the case of infants the lower method alone is available.

In these general rules I have presupposed the mastery of bronchoscopy, or at least the successful introduction of the tube. If the beginner fails even at this stage, tracheotomy is absolutely indicated in serious bronchoscopic cases. The operation which, with adults, will always be effected with local anesthesia involves only a minimum risk, and the dangers of breathing through the canula, and the difficulties of decanulation, are entirely avoided. It is therefore not right to endeavor at all hazards to avoid tracheotomy in favor of the more elegant upper operation, or even to force the latter in a manner not favorable to the interests of the patient. For the patient—apart from the demands on his patience and endurance—the length of time occupied by the endoscopic operation is most important. Indeed, it may be said that the dangers of bronchoscopy lie primarily in its duration, and that in cases which end fatally, if the method itself can be blamed, it is the duration of the examination which plays an important part. The reasons of this are obvious. For one thing, danger from cocaine increases rapidly with the duration of examination, because, even when introducing the tube, the maximum dose is often necessary. Further, it must be noted that physical excitement, reflexes, and direct obstructions caused greatly increased demands to be made on the heart and breathing, and that in many cases the lungs are diseased, or the respiratory center injured by prolonged dyspnea, and this renders the patient unfit

to cope for any length of time with such increased demands. If the operation is performed without an anesthetic, an excessive prolongation of the operative shock, together with the two other drawbacks, may lead to fatal collapse. When there is no danger in delay, difficult bronchoscopic operations should be distributed over several sittings than that the duration of the tube introduction should exhaust the patient. Several carefully considered examinations generally yield a better result than a single forced sitting. I call to mind the extraction, carried out by Killian and myself, of a bronchial foreign body which extended over ten sittings, some of which attained the great length of two hours. It is not possible, of course, to state a normal period or maximum period for the duration of bronchoscopic operations. As a rule the tube has to remain on its place from five to fifteen minutes. In one favorable case I was able to extract a bone from the right main bronchus in less than three minutes (counting from the moment when the tube was first introduced). Fortunately the dangers already enumerated, which are generally avoidable, are almost the only ones which are connected with bronchoscopy proper. In order to state the actual position, I give Jackson's statistics for ninety-four cases of upper and lower bronchoscopy of foreign bodies, with a mortality of 9.6 per cent. Six of these cases Jackson himself deducts because the examinations were undertaken on patients who were in such a condition that a fatal termination was to be expected. This leaves only 3.2 per cent., of which 2 per cent. occurred in children, which bears out what has been said above."

In these remarks by Brunings there are several things to which one may rightly take exception. First of all, the upper operation is more popular in this country than the lower, and in the average case is just as easy to carry out. The writer has never had occasion to perform tracheotomy for the removal of a foreign body in an adult; in children, where the difficulties are much greater, he has had to do the operation once following the removal of a watermelon seed from the trachea of a child, two years old, for edema of the glottis from pressure of the bronchoscope. Jackson points out that edema is much more apt to occur after the use of large than small tubes, and it would seem that the use of Brunings' tubes, which are larger than Jackson's, would lead oftener to tracheotomy. This is one reason why the writer prefers Jackson's tubes. The writer cannot agree with the statement that lower bronchoscopy is technically easier to carry out; the simple introduction of the instrument may

be so, but it is not such a simple matter to do a tracheotomy in a little child, and these are practically the only patients who require the operation. The entire procedure is more difficult in the writer's opinion than the careful introduction of the tube between the cords. That there are conditions arising in tracheo-bronchoscopy that require tracheotomy is undoubtedly true, but the bronchoscopist should endeavor to become so skillful in introducing the tubes and in manipulating instruments through them that the indications for the operation will become less and less. If one has trained the eye to work through small tubes, one will gradually become so expert that the removal of the average foreign body will take only a few minutes, which will cause no damage to the larynx. Edema of the glottis following extraction of foreign bodies is caused either by the use of a large tube or the prolonged pressure of a small one. It behooves bronchoscopists, therefore, to work as rapidly as is consistent with safety. In the case of infants, Brunings believes that the lower method alone is available. In these cases the trachea is so short that one may occasionally be able to remove the foreign body through the direct laryngoscope by introducing the forceps between the cords; or the 5-millimeter tube may be carefully pushed between the vocal cords when the foreign body usually comes into view if it is of any size. A foreign body must be very small to enter the bronchus of an infant. In view of these facts the writer is opposed to tracheotomy in infants until a fair trial of the upper method has been instituted. The tube should never be kept in the trachea long at the time; if after a few minutes the attempt proves unsuccessful, one should try again another time. Brunings' objections to the prolongation of the examination because of possible cocaine poisoning are answered by the substitution of alypin which will allow one to work a long time. The writer has frequently kept the 9 millimeter in the trachea and bronchi for thirty minutes or longer in demonstrations without the slightest harm to the patient. He would not hesitate to keep it in longer if it should be necessary. The only discomfort is slight hoarseness, which passes off in two or three days.

It is scarcely necessary to impress upon laryngologists the importance of strict asepsis in tracheo-bronchoscopy. All metal instruments should be boiled, the small lamps should be sterilized in small glass tubes, and the light carriers immersed in carbolic solution. It is better to pay some attention to the mouth such as cleaning the teeth and washing out the mouth with 30 per cent. solution of alcohol

as suggested by Jackson. A tube which has been passed through the mouth should not be introduced through a tracheal wound without being freshly sterilized. In ordinary examinations only the instruments which are actually to be used need be sterilized; these include the tubes, applicators, and always the forceps and probe. It is always advisable to have forceps ready for a possible foreign body or the removal of pathological tissue. This prevents the necessity of sterilizing them after the tube is in position or a possible second examination. In the average examination under local anesthesia only one assistant besides the nurse to support the head is necessary; he prepares the applicators, handles instruments, etc. One instrument which should always be handy is a tongue depressor or mouth gag, the importance of which will be emphasized under another heading. In foreign body cases under local or general anesthesia, all instruments should be sterilized, for one never knows what instrument or how many he will need. Most writers lay special emphasis on trained assistants; Jackson and Brunings both lay great stress on this point. The writer, while not wishing to take issue with two such noted bronchoscopists, respectfully submits that trained assistants are not absolutely necessary for successful work. In his methods he has dispensed with an assistant to hold the head by keeping the head on the table during the entire examination. He requires an anesthetist when general anesthesia is used and two other assistants who may or may not have been trained in bronchoscopic work. Having worked repeatedly in hospitals, where the assistants had never seen such work, he feels that he can safely make the above statement. With the table close at hand which is possible by dispensing with the man to hold the head, one can help himself in many ways. It is better, of course, to have trained assistants in any surgical operation, but the writer contends that they are not absolutely essential to successful bronchoscopic work.

#### LOWER TRACHEO-BRONCHOSCOPY.

Lower tracheo-bronchoscopy can be done through high or low tracheotomies, preferably the former, because it is the more easily performed. It is, however, not difficult to open the trachea low down if one has had the proper surgical experience. The latter operation lessens the distance to the bronchi in which foreign bodies so often lodge. In the removal of foreign bodies, the tracheotomy wound is immediately used for the passage of the tube; for other purposes it is perhaps better to wait a few days after the operation before inspecting the trachea. In such case it is well to wash the neck

with bichloride solution and to cleanse the wound with peroxide of hydrogen before passing the tube. The tracheoscope, measuring 8 inches, is long enough for inspecting the trachea and bronchi of most patients and the writer prefers it because it is easy to manipulate. When all is in readiness, the wound is anesthetized with 20 per cent. alypin solution; the tracheoscope is then passed from either side with the patient's head inclined to the opposite side. In some individuals the mucus membrane of the trachea is not sensitive and it is easy to push the tube further down; in others the use of alypin is necessary to quiet the cough reflex and the anesthetic applied by means of applicators passed through the tube. When the bifurcation is reached, the bronchi are easily explored by passing the tube to the right or left according as one wishes to enter the right or left bronchus. If the tube is passed from the right side of the neck and one wishes to explore the left bronchus, the tube is carried slightly to the left as it approaches the bronchus. To examine the right bronchus it is better to withdraw the tube and to introduce from the left side of the neck. In the removal of foreign bodies the tube is passed through the wound as soon as the bleeding stops. Here again it may be necessary to use a few drops of anesthetic to do away with the cough reflex. In small children the 5-millimeter tube is large enough for the removal of foreign bodies provided one has a slender forceps. The writer prefers to do lower tracheo-bronchoscopy with the patient sitting, though it can be done with the patient supine. The position will be described under the upper method since the writer uses the same supine position for all operations. It should be emphasized that the operator must never push the tube down without the guidance of the eye which should control every movement of the tube from the time the posterior wall of the trachea comes into view. At this point the tube is straightened and the descent is then easy. In all bronchoscopic examinations, gentleness in the manipulation of the tube is a *sine qua non* for, otherwise, serious damage may be done. The examination of the different walls of the trachea and bronchi can be made by gently moving the head in different directions. By passing the tube from below upward, the subglottic space can be examined provided the wound is low enough down. In low tracheoscopy the bifurcation often comes into view as soon as the tube is straightened out, and this landmark should always be kept in view because it is easy to slip by it into the right bronchus. If the bifurcation does not present when one wishes to examine the tra-

chea, it is a good rule to draw the tube up and move it from side to side until it is seen. The picture which the bronchi will present will be described under upper tracheo-bronchoscopy. The color of the mucus membrane of the trachea varies from a light to a dark pink color; adrenalin blanches the color of the membrane materially. As operators become more expert, the lower method will be used less; in the treatment of stenosis of the trachea it helps greatly in getting at the trouble, but exposes the patient to all the dangers of the tube wearer. In one case of stenosis treated by the writer, tracheotomy had to be done hurriedly to save life. The writer believes that tracheotomy is seldom justifiable in tube work. That lower tracheoscopy is easier than the high operation to the beginner goes without saying, but to the expert operator, who has introduced the tube a number of times, the high operation is not difficult. Jackson has made the remarkable statement that he prefers to do the high operation even when a tracheotomy wound is present.

(To be continued.)

#### THE RADIOGRAPHY OF GASTRIC PTOSIS.

Given a case of suspected gastropsis, the roentgenologist first determines whether or not the typical roentgen picture of the condition exists, giving due consideration to the anatomical type of the individual. Following this, he observes the extent of ptosis, the degree of atony, and delay in the emptying time. Next, he must be assured that the position of the stomach is not due to extragastric causes, such as pressure or traction. Knowing that an apparent ptosis may exist without symptoms, he must determine whether the atony and dilatation and the other factors in retention are those truly associated with a gastropsis, or arise from other causes, such as pyloric spasm, pyloric obstruction or duodenal stasis from traction on the mesentery through adhesions of the ileum or a ptosis of the right half of the colon.—H. K. PANCOAST in *The Pennsylvania Medical Journal*.

A tender, painful swelling just at or below the upper, outer border of the breast, and near the edge of the pectoralis major, is usually an inflamed lymphatic gland. In its presence it is well to look for some skin infection about the waist line, e.g., furuncles, which are not rare at this site as a result of irritation by the corset. Per contra, with a boil, abscess, dermatitis or other infection at or above the waist line, one may be on the lookout for glandular enlargement at the point referred to.

#### SPLENECTOMY FOR SPLENIC ANEMIA— REPORT OF A CASE AND DESCRIPTION OF THE OPERATION.\*

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Splenic anemia was first systematically described by Banti in 1883 although the disease had been known for some twenty years before. For years after this, isolated cases were reported, until in 1902 Osler brought the subject again into prominence. The etiology is unknown. The disease, while supposed to be very rare, is really not infrequent. Most of the cases reported have been in males. The disease occurs at all periods of life, but cases in very young children are not common. The patient (Fig. 1) here reported, is of a child but 5½ years old. In several cases reported there has been a family incidence. Banti describes the disease as having three states: first, enlargement of the spleen with anemia of a secondary type; second, enlargement of the liver; and third, the ascitic stage. The diagnosis is relatively easy if the disease is thought of. It is made on the enlargement of the spleen with a secondary anemia and without much variation from the normal of the white cells; usually the number of white cells is, if anything, decreased. The conditions which are to be differentiated are splenomegaly without anemia, splenomegaly with anemia dependent upon various infective processes such as syphilis, tuberculosis, malaria, uncinariasis, kala-azar, malignant endocarditis, septicemia, etc.; pernicious anemia, leukemia, Hodgkin's disease, splenomegaly following cirrhosis of the liver and interference with the portal circulation.

Splenectomy has been done in these cases ever since Banti's original paper and is advocated on the hypothesis that the seat of the trouble is the disturbed metabolism of the spleen. However, this may be, it is certain that this disease not treated by splenectomy terminates eventually in death in a majority of cases; while splenectomy done in the early stage is curative. Of ninety-eight cases\*\* of splenectomy for splenic anemia done in various stages of the disease, seventy-seven recovered and twenty-one died, a mortality percentage of 21.4 per cent. Collected statistics do not give an accurate understanding of the mortality, as fatal cases are not reported unless of special interest through the pathological findings. Statistics of individual observers are much more illuminating. Interesting in this connection is the report by Richards of twenty-

\*A Clinical Lecture at the Methodist Episcopal Hospital, April 11, 1914.

\*\*Collected statistics of Bessel-Hagen, Johnston and Deaver



two cases of splenectomy, with four deaths, for Egyptian splenomegaly, a disease which is quite similar to Banti's disease. Two of these cases were in the final stage of the disease. Excluding these two cases the statistics show a mortality of 10 per cent., while in eighteen cases of splenectomy for splenic anemia by Mayo there was a mortality of 11½ per cent. As just stated, the benefit the patient derives from splenectomy depends upon the stage in which the operation is performed. Done early the operation is curative. Of thirty cases collected by Banti, including ten of his own, four were operated upon in the first stage of the disease, of whom three were cured; twenty-two were operated upon in the second stage, of whom thirteen were cured; four were operated upon in the third stage, of whom one was cured. Of the eighteen cases operated upon by W. J. Mayo, two died as a result of the operation; twelve were well from one to seven years after the operation; two were improved; one died three years after the operation, showing improvement until shortly before death; one died two and a half years after operation, cause unknown. The final results of the cases operated upon by Richards and Aly Bey for Egyptian splenomegaly show that eighteen cases were successful in that the patients left the hospital in better condition than when they entered it. These cases were seen nine months to two and a half years after operation and were in good condition, some of them doing hard physical work.

The history of this case is as follows:

E. P., admitted January 30, 1914, aged 5½ years, male, and subsequently referred to me for operation by Dr. Raymond Clark, attending physician. Chief complaint, pain over whole abdomen. No similar cases in family; no chronic diseases. Patient was always well until last summer (1913), when he had a very mild attack of scarlet fever. Since then he has not shown the same desire to play. Soon after recovery from scarlet fever and again on January 23, 1914, had severe cramp-like pain in the abdomen. In the second attack he had a severe nose bleed. The abdominal condition was met by a dose of castor oil and hot applications to the abdomen. Next day he appeared well. There was a third attack on January 23, with severe abdominal pain which was not relieved by previous methods. Pain continued all night; the bowels did not move; no history of vomiting; appetite has been good. Physical examination at time of admission: patient appears to be in good health. Mucus membranes are pale. Eyes, ears, nose, and mouth are apparently normal. Thorax, expansion good and equal on both sides, no adventitious sounds heard. Percussion normal. Heart, normal size and position, rate rapid, no murmurs or accentuations. Later a murmur developed as a result of the profound anemia.

Abdomen, liver not palpable, spleen enlarged almost to the iliac crest, no other abdominal organs palpable. On February 5, liver was palpable below costal margin. On March 21, upper border was in fourth space, lower border 5 c.m. below costal margin. Fluid found in both flanks. On April 4, lower border 7 c.m. below costal margin, vertical diameter 11 c.m. During the first twenty-seven days in the hospital the temperature held about normal. He then had a severe epistaxis bringing the pulse from 110 up to 140. After this the temperature varied from 98° to 101°, with an afternoon rise each day. Seven days later he had another epistaxis and a third five days after this. After a two-day interval he again bled, then went a week before having his fifth nasal hemorrhage. By this time the patient had developed an ascites. On the fifty-sixth day in the hospital temperature jumped to 104.4°, pulse 160, respirations 60. Four days later temperature, pulse, and respiration had re-

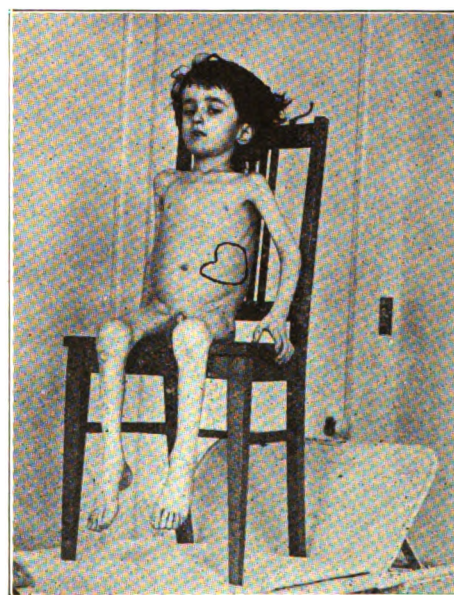


Fig. 1. Showing outline of the spleen.

turned to normal after a rigid diet on a minimum of fluids. After staying normal for six days, on the sixty-sixth day in the hospital the temperature began a daily variation, reaching 102° or 103°, and at some time during the day dropping back to normal. This type of temperature was maintained for nine days, when splenectomy was done—seventy-eight days after admission. On only one occasion have tarry stools been noticed. Blood counts show a persistent high color index with a marked anemia but no megaloblasts. Normoblasts were quite numerous from the onset. Ten separate blood examinations show an average red cell count of 2,160,000 and an average hemoglobin percentage of 56. The leucocytes have varied markedly, usually ranging around 11,000, but on one occasion reaching 36,000. The polynuclear count has been low throughout, averaging about 44 per cent., once as low as 23 per cent. Other examinations: Wasserman, negative; von Pirquet test, negative; stools negative for para-

sites or ova; blood culture was sterile. Treatment has been entirely hemotinic, using Zambeletti and later sodium cacodylate and local treatment of oozing nasal mucosa with adrenalin. The bed has been outdoors practically all the time. The diet has been simple, with an eye to improving the blood with such things as oatmeal, green vegetables, etc.

#### COMMENTS DURING THE OPERATION.

The child now is in about as good condition as could be secured. Almost the entire success of this operation depends upon whether or not we will be able to remove this spleen without hemorrhage. In addition, artificial warmth will be applied to the patient during the course of the operation. All clothes and pads used in connection with the operation will be warm. In a case such as this in which the diagnosis is quite certain one has the choice of any incision. In adults the incision of choice would be the Auvray incision (Fig. 2), which, briefly, is as follows: The primary incision is made in the usual manner along the outer border of the left rectus muscle extending up to the costal cartilages. It is particularly indicated in difficult cases. Exploration having shown the case to be a difficult one requiring more room at the upper end of the incision, this is extended upward and posteriorly over the lower ribs at the level of the eighth interspace. The flap of the soft parts is dissected outward so as to show the eighth, ninth, and tenth ribs. This cartilaginous segment is now excised by dividing the cartilages close to their anterior extremities and freeing the segment from before backward and below upward, keeping close to the ribs during the dissection. Finally the excision is completed by separation of the segment a little anterior to the costochondral juncture. In this case we have made a skin incision as described by Auvray and have entered the peritoneal cavity in the usual manner along the outer border of the left rectus muscle. In children, however, it is not necessary to excise the lower segment of ribs, but the incision is now carried across the costal cartilages so as to allow of the introduction of a broad retractor pulling the lower part of the costal arch upward and to the left so as to expose the vault of the diaphragm. All bleeding from the wound has been stopped and wherever possible vessels have been caught before they were sectioned. A warm laparotomy pad is now introduced into the wound and all bleeding points ligated. I stand upon the patient's left, as I find it easier to do the operation from that side, except possibly the ligation of the splenic pedicle. In the splenectomies which I have performed I have not found any difficulty from standing in this position. Jonnesco advises that the operator stand at

the patient's right in order that the pedicle may be better inspected. The bleeders now having been tied off, the left hand is gently inserted into the abdominal cavity on the convexity of the spleen and swept over the diaphragmatic surface. Here we find a few adhesions; there is also on the outer side an adhesion of omentum of the abdominal wall. This adhesion is not separated, as any other procedure except the splenectomy is to be deprecated. Exploration of the lower pole of the spleen does not reveal any adhesions. The lower pole is not allowed to come out of the wound and the colon, which presents at this moment, is gently pushed back with a warm laparotomy pad. A warm gauze pack one yard square is now ready; this will be introduced and packed against the diaphragm as soon as the upper pole of the spleen is separated from it. I make this separation quickly, but do not allow the spleen to snap or come out forcibly so as to make undue tension on the pedicle. Too quick or forcible removal of the spleen may rupture the delicate veins of the pedicle. The diaphragmatic pack is now introduced while the spleen is steadied by an assistant and held in such a manner as to cause the least possible tension on the pedicle itself. As the spleen comes out of the wound it can be seen that part of the fundus of the stomach and part of the transverse colon came with the pedicle. A warm laparotomy pad is placed against the fundus of the stomach. So far there has been not one drop of blood lost except a teaspoonful or so which came from the oozing of the abdominal wall.

The pedicle of the spleen requires particular and careful attention. It is composed of six to twelve branches of the splenic artery, each artery going to a different part of the spleen and not anastomosed with its neighbor. The veins accompany the arteries. A gastro-enterostomy clamp, the blades of which are protected with rubber tubing, is now passed about the pedicle of the spleen. In this case, since the pedicle is short, the clamp is placed one inch from the splenic tissue itself. We would like to get a little more room to doubly ligate the pedicle and so prevent the soiling of the wound from the escape of the blood contained in the spleen. In this case it is not possible. We must be content to place the gastro-enterostomy clamp so as to include the tail of the pancreas and part of the stomach. The clamp is now set so that there is no longer any danger of hemorrhage. The pedicle is ligated in sections, taking care that the needle carrying the ligature does not injure the vessels. The spleen is now cut away. There is some escape of blood from it. This could have been avoided had it

been practical to doubly ligate the pedicle. In placing these ligatures care was taken not to include the tail of the pancreas. Von Herschel attributed the peculiar form of fever which sometimes follows to injury to the tail of the pancreas. In three cases of Mayo's the tail of the pancreas was included in the ligatures; this was known at the operation. No harm followed, although in one case the pancreatic duct could be seen open. Two clamps are now placed distally to the ligatures of the pedicle to prevent sudden retraction. The gastro-enterostomy clamp is loosened. It is seen that hemostasis is exact. With fine catgut the stump of the pedicle is sewed over, burying the raw surface. The gastro-enterostomy and other clamps are now removed and the stump allowed to slip back. A laparotomy pad is introduced into the wound and with the left hand in the wound retracting to the right, and a broad retractor under the ribs retracting to the left, the diaphragmatic pack is removed and the diaphragmatic vault inspected. It will be seen there is no oozing. Hemostasis is complete. Occasionally in these cases there are one or more bleeding points on the vault of the diaphragm; if so, they are secured by suturing with needle and catgut. No drain-



Fig. 2. Auvray's incision.

age is necessary. The laparotomy pads are now removed with the exception of the one which covers the abdominal contents and prevents their exposure to the air, and the abdominal wound is sutured in layers with a loop suture of chromic catgut; when the peritoneal cavity is almost closed the final laparotomy pad is withdrawn. The skin is sutured with silk, in this case a chain stitch being used so as to prevent oozing from the skin edges which in a patient as anemic as this one may occur. A firm abdominal binder is applied with the idea of overcoming the loss of intraabdominal pressure caused by the removal of the large spleen. This spleen has just been weighed and, even drained of its blood, weighs twenty-eight ounces. Since the normal weight of the spleen is from five to seven ounces, this organ is four to five times the normal weight.

*Complications that may occur after splenectomy.* Secondary hemorrhage is apt to occur if the pedicle is ligated *en masse* or if the ligature was applied while the pedicle is tense; it is due to retraction of the tissues. Neither of these conditions prevailed in the operation just completed. Of injuries to the pancreas we have spoken. Von Herschel thinks that fever follows injuries to the pancreas on account of the setting free of the fat-splitting elements. Thrombosis of the splenic vein has occurred; the symptoms of this are shock, abdominal pain, and vomiting. Summers has reported a successful case following this complication. Gastrointestinal hemorrhage may follow splenectomy. It is attributed by Leiblein to thrombosis of the short branches of the splenic artery.

*Subsequent Note.*—The case herein reported made a complete recovery, the convalescence being tedious because of the profound anemia, but it was otherwise uncomplicated, except for pains in the long bones. The red cells and proportion of hemoglobin decreased for a few days, then gradually increased. A leucocytosis (19,400 at first, gradually decreasing day by day) persisted for some days. The various types of white cells maintained approximated the normal proportion.

#### CHRONIC BACKACHE.

If a case is traumatic in origin and if the sacroiliac joints are normal in the roentgenogram and to the touch, it is to be assumed that the muscles, ligaments or joints of the spine or of the spine and pelvis have been sprained, and that the condition is similar to that of the sprain of any other joint. If the case is not traumatic in origin, lateral and anteroposterior balance are to be investigated, and static errors in the feet must be remembered as one cause of defective balance. The round back and the over-feminine figure seem especially prone to static backache, but the diagnosis of this type must sometimes be made in the absence of gross malposition.

In all cases in women the possibility of a pelvic cause must be borne in mind, and an inquiry into symptoms indicating pelvic disorder may lead to a conclusion that a competent cause for the backache exists there. The case must be classed as probably arthritic when it is chronic and there are marked stiffness and pain in motion, with muscular spasm and secondary lateral curvature. Referred pains in the legs and disturbances of sensation are suggestive. A fair-minded surgeon, however, must sometimes confess that he cannot classify the case with certainty.—ROBERT W. LOVETT, in the *J. A. M. A.*

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**WALTER M. BRICKNER, M.D., Editor**

**NEW YORK, JULY, 1914.**

## **METHODS OF BLOOD TRANSFUSION.**

When George Crile re-introduced blood transfusion as a now safe procedure he made a monumental and probably permanent contribution to medicine. Nor was that contribution merely one of method, which would have been important enough in itself; it included also a thorough study of the effects, under various conditions, of the transfused upon the recipient's blood and the laboratory contraindications supplied by hemolysis and agglutination. He provided, too, in his monograph, and in other publications, casuistic studies that supplied a clear basis for the indications for transfusions—which have subsequently been added to but not otherwise much altered. Crile's success depended upon abandoning the old indirect method of transfusion, with its inevitable clotting, in favor of a direct method, by which, for the time of the operation, the donor's and recipient's vascular channels are made continuous or, in other words, an uninterrupted tube of bloodvessel intima was provided in which the blood might flow from one body to the other without clotting. Most simply to effect this temporary vessel anastomosis Crile devised a cannula (or, more properly, set of cannulae), suggested in its form and purpose by Payr's ring.

Crile's cannula is still widely used, although it has been much modified by various men. Notable among the modifications and mechanical improve-

ments are Soresi's cannula and the admirable instrument of Elsberg. Carrel's suture anastomosis has also been much used in blood transfusion but, for obvious reasons, it could not compete with the cannula anastomosis as a routine.

The method of transfusion introduced by Crile and still widely employed is that of an arterio-venous anastomosis by which the donor's radial artery was sacrificed. This involves not only a rather delicate dissection but also a disfiguring scar. Vein-to-vein transfusion, now also much used, is quite as satisfactory, technically at least as simple, and certainly less mutilating. Less extensive dissection of the vessels is required when the communication is established through a paraffined glass tube, but this method has not won any general acceptance and the use of an animal tube, composed of a preserved segment of dog's carotid with cannulae at each end, proposed by Frank of New York, was not found practical.

These methods of direct transfusion all have possessed the shortcoming that the actual quantity of blood passing over from donor to recipient has been unmeasured. Libman and Ottenberg have recently described (*J. A. M. A.*, March 7, 1914. See this JOURNAL, May, 1914, p. 211) a method of determining this quantity. The factors in this computation are the body weights of donor and recipient and their varying hemoglobin percentages. This method, which its authors have found quite satisfactory, is not always applicable and affords, at best, only an estimate, not an actual measurement.

To measure the amount of blood passing over has led back to the old, abandoned indirect transfusion, eliminating the danger of clotting merely by developing the technic. Nor has the technic required presented any very novel feature. Edward Lindeman of New York has shown that blood can be safely transferred, in fluid form, from individual to individual by as simple a procedure as aspirating it from the donor's vein into a small piston syringe and injecting it therefrom into the recipient's vein. The only instruments required are two needles and a supply of well-made graduated glass and metal piston syringes. The essential factors in the success of this syringe transfusion are: speed and dexterity of operator and assistants, rinsing each syringe after using in warm saline solution, and maintaining a practically continuous flow through both needles of either blood or salt solution. This method not only provides at once exact measurement of the blood injected but also obviates the exposure and dissection of any vessels and the scar-

ring such exposure leaves. To those who would employ this admirable procedure we commend a careful reading of the technic as described by Lindeman himself, who has most employed it.

Another method of indirect transfusion has recently been recorded by W. L. Moss of Johns Hopkins University (*American Journal of Medical Sciences*, May, 1914). In his procedure clotting is prevented by defibrinating the blood. Aspirated from the donor's veins into Erlenmeyer's flasks the blood is there defibrinated by agitating with glass beads. Then poured into a large bottle, it is allowed to flow through rubber tubing and needle into the patient's vein, as in the intravenous infusion of saline solution. The optimum amount of defibrinated blood to be administered to an adult Moss puts at 500 c.c. His report deals only with the technic, but he has employed the method in 75 cases. He says that "the presence of free fibrin ferment does not seem to constitute a source of danger" and his results lead him to believe that "as much can be accomplished for the patient by indirect transfusion of defibrinated blood as by the more difficult direct transfusion of whole blood, except possibly in patients whose blood is deficient in fibrinogen."—W. M. B.

#### EMIL GRUENING.

The name of Emil Gruening, of New York, who died on May 30th at the age of 71, is indelibly written into the annals of American medicine. That he had made numerous and important contributions to ophthalmology established his reputation in a specialty in which he was a master clinician; that he was the first to call attention to wood alcohol as a cause of blindness was an accomplishment which, measured in terms of human life or reckoned merely as an important medical discovery, was enough to secure him in the permanent records of medicine; but greater even than these achievements, especially from a surgical standpoint, was his very early work in the introduction, and development of the mastoid operation, much of the fundamental technic of which, as it is performed today, must be credited to him. When one considers the anatomical and surgical complexities of mastoid inflammation and the obscurities that enveloped them at the time that Gruening, perhaps the first in this country, undertook mastoid surgery, his "pioneer" work will be appreciated in the full meaning of the word.

A Prussian by birth, Gruening studied medicine at the N. Y. College of Physicians and Surgeons. But he interrupted his course for several years to

serve throughout the Civil War the country to which he had just immigrated. Ophthalmology and otology are no longer much associated as specialties, but Gruening continued active in both until his death. On both he made his impression; in both he achieved the honors which his accomplishments had earned.

He combined with the clinician and the scientific student the now rarer qualities of the classical scholar. He was the type of man who would have led in any field of intellectual activity to which he might have devoted himself.—W. M. B.

## Surgical Suggestions

In cases of peritonitis it is desirable to employ the Fowler's position before, as well as after, operation.

Lipoma of the cord may much resemble a hydrocele. It is, however, less translucent, and rather less cystic to the feel.

Undertake no operation for abscess or other swelling about the chest without determining that it does not proceed from an intrathoracic source or being prepared to deal with such a finding.

The giant-cell sarcoma of the long bones is relatively benign and, as Bloodgood has shown, is often curable by thorough curettage properly performed.

The routine operative management of subacromial bursitis by excision, recommended in some text-books, is not to be endorsed. It is better to breakdown adhesions in the bursa, without or with excision of thickened areas, remove the semi-fluid-calcareous material beneath the bursa, stitch the tear that may be found in the tendon, and put the arm up in abduction.

Anterior weak-foot, or sinking of the transverse arch through the heads of the metatarsals, is a cause of painful feet often overlooked and mistreated by the application of the usual flat-foot arch. It is not difficult to recognize objectively; subjectively, it is characterized by pain in the toes. It is apt to be marked by plantar callus.



## Surgical Sociology

Ira S. Wile, M. D., Department Editor.

### UNEMPLOYMENT AND DISPENSARY SERVICE.

The problem of dispensary and hospital exploitation is frequently presented as dependent upon the inherent weakness of individuals desiring to get something for nothing. While it is undoubtedly true that a very small percentage of dispensary patients can afford to pay for the services secured, it must also be recognized that the vast majority of human beings are desirous of being self-supporting and independent of charities of all kinds.

The economic bases of dispensary service are complex. Few of them have been carefully studied; and still fewer are understood. The relation of industrial occupation to dispensary service deserves investigation. At the present time, serious thought is being given to the general problems of unemployment, the reason for its existence, the methods of its prevention, and the plans that may be devised to lessen its hardships. Minimum wage laws, decreasing the hours of labor, changing seasonal employments into all-year-round occupations, industrial reorganization, and unemployment insurance suggest lines of activity that are being followed, in order to demonstrate that public responsibility is being felt for unemployment and society is anxious to eliminate the existent burdens of this social oppression.

According to the United States Census for 1900, nearly 25 per cent of the working people of this country had been unemployed sometime during the year; 3,177,753 workers lost from one to three months' work each, representing on the basis of ten dollars a week, a wage loss of \$200,000,000; 2,554,925 were unemployed from four to six months of the year with a wage loss of approximately \$500,000,000; 736,286 lost work for from seven to twelve months at a loss of approximately \$300,000,000.

While census statistics are not accurate, they are very suggestive approximations gathered as carefully as may be possible. The loss of one billion dollars in wages is more than a mere financial loss, it is a social loss which is thrown upon the community. Irregularity of employment is a serious problem of industrial organization and its effects are manifest in every phase of human endeavor. Vagrancy, immorality, crime, riot, disease, impoverishment, under-nourishment, discontent, anemia, neurasthenia, desertion, suicide are some of the indiscriminate results.

The relation of dispensary and hospital service to this large unemployed portion of a community is of the utmost importance. Unemployment is a monumental cause of institutionalism. The cost of unemployment cannot be determined in figures, but it is fair to assume, that a large proportion of the general expenditures for hospital and dispensary

services must be accredited to the general social effects of unemployment. Times of unemployment are periods of temptation to crimes of trespass, particularly hazardous as indicated by the disability rate among the vagrant type. Vagrancy, however, must not be regarded as synonymous with unemployment. The true vagrant is generally a defective while the unemployed man is forced through economic conditions into his abnormal life. Enforced unemployment is hazardous in the extreme to himself, involving the moral deterioration of his family and its health, and encompassing tremendous social losses which are reflected in the growth of institutions. The solution of the problems of unemployment will undoubtedly be attended by a decrease in a number of hospitals and dispensaries and an increase in the development of medical activity for private physicians.

## Book Reviews

**Surgery; Its Principles and Practice.** For Students and Practitioners. By ASTLEY PASTON COOPER ASHHURST, A.B., M.D., F.A.C.S., Instructor in Surgery in the University of Pennsylvania; Associate Surgeon to the Episcopal Hospital; Assistant Surgeon to the Philadelphia Orthopedic Hospital and Infirmary for Nervous Diseases. Large octavo; 1,141 pages; seven colored plates and 1,032 illustrations. Philadelphia and New York: LEA AND FEBIGER, 1914. Cloth, \$6.00, net.

It is an herculean effort to encompass the principles and practice of modern surgery within a single volume, and, if Ashhurst has not met with the full measure of success, he is in the class of many others who have made the attempt and have failed. Indeed, the reviewer knows of no altogether satisfying single volume text-book of surgery. It should be placed to Ashhurst's credit, however, that he has more nearly succeeded than most who have tried. Throughout his work one finds evident sincerity of purpose and studious application to the task. What then are the shortcomings of his book?

A picayune quality would be found in criticism directed at small, debatable points, and the reviewer wishes to avoid this quality. Frankly stated, therefore, the book, coming from the pen of a man who wrote that admirable and well-planned monograph on "Fractures of the Lower End of the Humerus" is found poorly balanced, and altogether too superficial. The serious student will find many important questions only partly answered. The practitioner, for whom the work is in part meant, will find it complete in some places, very incomplete and rather puerile in others. If Ashhurst had only adhered systematically to a plan he evidently had—a large surgical monograph—the work would have been far more successful. But the irregular infusion of the author's opinions throughout the book robs the work of the possibility of a straightforward text-book and yet does not give it the quality of a monograph. Many statements are merely made by Ashhurst which, had they been placed in a monograph, he would surely have justified by some proof. The reviewer has notes of many, of which the following may serve as examples: "I do not think much of strychnine except as tonic." (p. 44.) "Usually it is easy to differentiate clinically between sapremia and toxemia because in the former case there always is some dead and decaying tissue present where the putrefactive bacteria multiply. If this material is removed, the bacteria are removed with it, absorption ceases, and health is restored." (p. 15.) "The V. Pirquet reaction appears to indicate the existence of latent or healed tuberculosis (very rare in children) quite

as readily as an active focus; it is not regarded as so accurate as the hypodermic test for adults." (p. 81.) "Acute rheumatic arthritis, unless some efficacious serum or vaccine is secured soon, will become a surgical disease when physicians become thoroughly convinced that it is a form of pyemia." (p. 473.) In the symptoms and cause of acute appendicitis temperature, pulse, leukocytosis "are of quite secondary importance." (p. 852.) It is futile to multiply these excerpts.

In some parts of Ashhurst's book neither student nor practitioner will find sufficient information about subjects of prime importance. Thus subphrenic abscess is described in half a page; the symptoms and physical signs of brain and spinal cord tumor on a page each; symptoms and diagnosis of ectopic gestation on a half page; etc.

Thus far the book of Ashhurst has been painted a very somber hue. If the many relieving features are briefly enumerated instead of being as fully stated as the adverse criticism, the reason should be sought in the lack of room in these columns. The author's style is generally clear, concise and well-couched. His chapters on hernia, and on the other parts of abdominal surgery, as well as that on fractures, are splendid; student, practitioner and surgeon will be well repaid by a careful perusal of these sections. A consistent effort is everywhere made to bring the subjects up to date. Although there is no novelty in the method of treating the subject matter employed by Ashhurst, he follows the well approved groupings of chapters and sections in a very rational way. The illustrations are a very unusual feature—largely original and intelligently selected. The publishers have done their share in making the book attractive and wieldy.

**La Stase Intestinale Chronique.** Par DR. E. SORREL, Ancien Interne, Lauréat des Hôpitaux de Paris et de l'Hôpital Maritime de Berck-sur-mer; aide d'Anatomie des Hôpitaux. Octavo; 252 pages; 28 illustrations and and radiograph reproductions. Paris: G. STEINHEIL, 1914.

This monograph, appears at a time most opportune for such a publication, and it cannot fail to serve a very valuable purpose. It is clearly the object of the author, without pushing his opinions to the foreground, to collect the data that have appeared during the last half decade, on the subject of intestinal stasis and to systematize them.

The literature is voluminous, in many languages, widely dispersed. Impartially, Sorrel has collected it all and presents it to the reader, *seriatim*, clearly and succinctly.

The anatomy and physiology of the large intestine are considered; also its pathology. The ideas of Wilms, Lane, Stierlin, Klose, de Quervain are brought together, elucidated and compared. The views on such subjects as "mobile cecum," "typhlatomie," "Lane's kink," "habitual torsion of the cecum," "pericolitis," "Jackson membrane," etc., are shown in their truest light, and a comparative valuation is attempted.

The chapter on symptomatology is minutely and carefully written. That on treatment is probably the most valuable one in the monograph. The surgical treatment is considered in detail; the results are carefully collated and the operative procedures rationally criticized.

Throughout the book there is a distinct tendency to do full justice to Lane and his followers.

The language is simple French, easily understood and translatable. Sketches and radiograph reproductions illuminate the text.

The monograph is highly to be commended as probably the only one that has yet appeared attempting to do justice to the contending views on this complicated subject.

**The Principles of Pathologic Histology.** By FRANK B. MALLORY, Associate Professor of Pathology, Harvard Medical School. Pathologist to the Boston City Hospital. Octavo; 677 pages; 497 figures containing 683 illustrations, 124 in colors, and all but two original printed directly in the text. Philadelphia and London: W. B. SAUNDERS COMPANY, 1914.

The purpose of this book is more than an attempt to separate the histological description of lesions from the gross. The author appreciates fully that the leading aim of the pathologist is not the mere ability to diagnose

a given lesion under the microscope, but the biological interpretation of the lesion from its very inception. In this respect the work before us possesses a distinct individuality. The author attempts to trace lesions back to their original sources, describing the various cellular conflicts that bring about the various pathological processes. He shows how important it is to possess all stages of a given lesion, and how necessary it is for their interpretation to have tissues well fixed and stained by various methods in order to bring out the ultimate histological details. The book is divided into two parts. In the first, entitled *General Pathologic Histology*, the basic changes of tissues are discussed. In this part the author has put forth his best labors, and the exposition of the finer processes of inflammation, retrograde changes, he changes induced by bacteria and parasites, and tumors is set forth in masterly fashion. The second part, dealing with the special *Histologic Pathology of organs* appears rather hastily written, is full of lacunæ and is decidedly less satisfactory. In the preface, Mallory indeed admits that the book is at present a mere framework for subsequent addition, so that criticism on the inadequacy of certain portions of the text is to a certain extent disarmed.

The text reviews entirely the personal experiences and views of the author, references to the literature being entirely omitted. Certain pathologic criteria which the author has introduced for the study of lesions, for instance, collagen fibrils, assume an important place. The text is written didactically and ably and the illustrations are without exception superb.

**Radium and Radiotherapy.** By WILLIAM S. NEWCOMET, M.D., Professor of Roentgenology and Radiology, Temple University, Medical Department; Physician to the American Oncologic Hospital; Fellow of the College of Physicians, Philadelphia. Small octavo; 315 pages. Illustrated. Philadelphia and New York: LEA AND FEBIGER, 1914.

The scientific and medicinal properties of radium, thorium, and of the other less known radioactive elements are presented in a clear and easily understood fashion in this book of 315 pages. There has been a pressing need for a work of this type in the English language, a source for authoritative information in a form comprehensible to those "not up on the subject" and Newcomet has well met the demand. The considerable space devoted to the chemistry and physics of the radioactive elements is very welcome, for the properties as well as the physiological and therapeutic results of these elements should be thoroughly understood. Naturally enthusiastic about the effects of radioactivity on neoplasms, the author nevertheless balances his remarks by fair and conservative statistics. In short, his book can be recommended to all beginners in the field.

**Diseases of the Heart.** By JOHN COWAN, D.Sc., M.D., F.R., F.P.S. Professor of Medicine, Anderson's College Medical School; Physician, Royal Infirmary; Lecturer in Clinical Medicine in the University, Glasgow; Examiner in Medicine, Royal Army Medical College. With chapters on the Electro-Cardiograph, by W. T. RITCHIE, M.D., F.R.C.P., and the ocular manifestations in arteriosclerosis, by ARTHUR J. BALLANTYNE, M.D., F.R.F.P.S. Octavo; 438 pages. Philadelphia and New York: LEA AND FEBIGER, 1914. Price, \$4.00.

This volume represents an effort to bring up to date, for the practitioner, the recent advances in cardiac research and knowledge. The subjects of diagnosis, prognosis and treatment of heart diseases are reviewed with particular reference to the studies of the last decade.

This well-printed volume accomplishes the object of the author. It is well written, logically arranged; the language, even when discussing such complicated subjects as electro-cardiography and sphygmography, is clear and the argument is easily followed.

The chapters on the pathology of the myocardium, and of the arteries are complete, and careful studies.

Those on abnormalities of cardiac rhythm, nodal rhythm, auricular fibrillation, flutter, etc., portray in interesting form these newer studies. The tracings are good throughout, well marked, and well described, as well as numerous. Illustrations are frequent and distinct.



Acute endocarditis is briefly described; it cannot be said that the author does justice to the subject of sub-acute endocarditis of the bacterial type.

The discussion of chronic valvular disease, while not presenting any new viewpoints, is amply descriptive and complete. The text-book style is discarded, and case histories are introduced liberally; this adds interest to the reading of the text. The case histories, however, are entirely too complete and occupy altogether too much space.

There are few criticisms to be brought against the book. Literary references are scant. The work is the reflection of the author and of his views throughout.

The subject of treatment is not complete; the particular favorite prescriptions of the author being again and again reiterated, nor is anything added to the subject of digitalis therapy out of the large experience of the writer. The subject of orthodiagraphy is conspicuous by its absence.

The book will serve a valuable purpose in presenting in interesting form the newer ideas on cardiac pathology, physiology and symptomatology.

**A Handbook for the Post-Mortem Room.** By ALEXANDER G. GIBSON, D.M. (Oxford), F.R.C.D. (London), University Demonstrator in Pathology, Oxford, and Honorary Assistant Pathologist to the Radcliffe Infirmary, Oxford. Duodecimo; 140 pages. London: HENRY FROWDE, Oxford University Press; HODDER and STROUTON, 1914.

The author limits himself entirely to the proper technical performance of post-mortem examinations. The necessary instruments are described and their use indicated. The correct procedures of examination of the external surface of the body and of each individual organ are described in detail. The work ends with advice on the conduct of certain special autopsies, such as cases of drowning, medico-legal cases, etc. We have found no points for criticism, and the book can be cordially recommended for the purpose for which it is intended.

**Man's Redemption of Man.** A lay sermon, McEwan Hall, Edinburgh, Sunday, July 2, 1910. By SIR WM. OSLER. Duodecimo; 63 pages. New York: PAUL B. HOEBER, 1913.

In this thoroughly delightful and characteristic essay, Osler sets forth the benefits of some of the epochal discoveries in medicine—anaesthesia, antiseptics, bacteriology and immunity. As an interpreter of medicine for the lay mind, Osler has few equals, and this essay is in his best vein.

**A Way of Life.** An address to Yale Students, Sunday Evening, April 20, 1913. By SIR WM. OSLER. Duodecimo; 62 pages. New York: PAUL B. HOEBER, 1914.

The theme of this essay is the importance of doing well the day's work without any thought of the morrow. In the exposition of this idea, Osler brings to bear all his familiar charm of style, wealth of quotation and appositeness of illustration.

**The Road to a Healthy Old Age.** By THOMAS BODLEY SCOTT. Duodecimo; 104 pages. New York: PAUL B. HOEBER, 1914. Price, \$1.00.

This little volume contains four chapters which deal with the subject of arteriosclerosis and its management. The author offers many helpful suggestions, especially as regards drug therapy, and presents his subject matter in a very readable and interesting style.

## Books Received.

**Operative Surgery for Students and Practitioners.** By JOHN J. McGRATH, M.D., Clinical Professor of Surgery, Fordham University; Professor of Operative Surgery, New York Post-Graduate Medical School, etc. *Fourth edition.* Octavo; 838 pages; 364 illustrations. Philadelphia: F. A. DAVIS Co., 1913. Price \$6.00.

## Progress in Surgery

A Résumé of Recent Literature.

**Latent Mastoiditis.** WILLIAM MITHOEFER, Cincinnati, *The Lancet-Clinic*, May 9, 1914.

The author cites several cases in which inflammation of the mastoid cells existed after apparent termination of the acute inflammation of the middle ear. The drum membrane may be intact; there may or may not be a mild degree of deafness; the handle of the malleus may be ill-defined or there may be very slight bulging of the upper posterior quadrant of the drum membrane. In other cases the drum may be absolutely normal in appearance. Mastoiditis in such cases may be very easily overlooked, even when the suppuration in the cells is already far advanced. The cessation of the discharge does, therefore, not signify a cessation of the inflammatory process, for the latter may be dormant for months or years in the mastoid cells. The factors at work in the production of latent mastoiditis are, the anatomical character of the mastoid cells, the shape and position of the antrum, the variety of the infecting organism and the resistance of the patient. The indications for operation are: Pain on pressure over the mastoid with a history of a former discharging ear, with a normal tympanic membrane and a positive X-ray plate. Painful mastoid with history of a former discharging ear, the tympanic membrane showing hyperemia or slight bulging of the upper posterior quadrant with positive X-ray plate. The presence of streptococcus mucosus in the exudate, with or without pain on pressure over the mastoid. Intra cranial complications having their probable origin from the mastoid cavity.

**Treatment of Severe Hemorrhages Complicating Pregnancy.** (*Behandlung Bedrohlicher Blutungen in der Schwangerschaft.*) P. JUNG, Göttingen *Deutsche Medizinische Wochenschrift*, April 30, 1914.

In cases of abortion complicated by active bleeding, the uterus should be explored at the earliest opportunity, even though all the products of conception are thought to have been passed. The old-fashioned curettage is entirely out of place in this exploration—it is dangerous and ineffectual. The only instrument to be used is the finger. If the cervix is open, the technic is very simple. There are two dissenting viewpoints as to the procedure when the cervix is contracted. The one is to gradually dilate, the other is to dilate at one sitting. The author favors the latter especially when fever already exists. The uterus should be explored in all septic abortions if there is any retention of ovular elements or if there is considerable bleeding.

Hemorrhage from carcinoma or myoma complicating pregnancy is not very infrequently encountered. The latter tumor generally exists in the form of a pedicled cervical polyp. This should be tied off, especial care being devoted to the stump because there is a tendency to secondary hemorrhage. If the cervical myoma is sessile, bleeding will not stop, in the great majority of the cases, until it is shelled out. The operative procedures need not result in abortion if the uterus is not roughly manipulated. Vaginal tamponade must first be practiced for bleeding from a cancer complicating pregnancy. Further procedures depend upon the operability of the tumor. If operable, there should be no delay in performing hysterectomy. Excochleation and cauterization are indicated for inoperable tumors, and, at the termination of pregnancy, the cesarian operation.

Varices of the genitals occasionally rupture and bleed furiously during pregnancy. If possible, the vessel should be transfixed by a ligature. This cannot be regularly done for the varices at the clitoris and labia, so that manual compression must often be practiced. If this does not control the bleeding, the entire bundle of veins must be surrounded by ligatures. Bleeding varices in the vagina should also be controlled by ligature, whenever possible, for vaginal tamponade may readily result in abortion.

**The Value of the Abderhalden Reaction in the Diagnosis of Pregnancy.** (*Ueber die Verwertbarkeit der Abderhaldenschen Reaktion in der Diagnose der Schwangerschaft.*) ERWIN SCHIFF, *Münchener Medizinischer Wochenschrift*, April 7, 1914.

Schiff employed the Abderhalden test against the serum from positively gravid women, and from women who were known to have various gynecological lesions the extent and nature of which were determined by operation. The conditions embraced tumors of the uterus, benign and malignant, inflammations of the uterus and of the adnexa, and tumors of the ovary. There was besides a number of cases of extra-uterine pregnancy and several cases of incomplete abortion. In the instance of pregnancy the Abderhalden reaction was strongly positive; in the other instances the reaction was either negative or mildly positive. Schiff concludes that certain ferments circulating in the blood of the gravid woman are intended to split placental tissue and these ferments are specific. These ferments react only to placental tissue and are to be found exclusively in the blood of the pregnant woman.

**Further Experiences With the Posterior Cervical Cesarean Section.** (*Weitere Erfahrungen mit der Sectio Caesaria Cervicalis Posterior.*) O. POLANO, *Münchener Medizinischer Wochenschrift*, April 14, 1914.

Seven more cases are added to the author's report of two years ago of his method of posterior cervical Cesarean section. The favorable results justify the further employment of this method of Cesarean section and the author goes so far as to recommend it in all emergencies where delivery must be through the abdominal route. The advantages claimed are the avoidance of post-operative abdominal-uterine adhesions, the more efficient cleansing of the Douglas sac in case of infection and, if necessary, easy pelvic drainage. The uterine muscles as such is also preserved intact rendering puerperal involution more complete. The method can also be carried out when the external as is only partially dilated.

**Kontralnesin (Richter) as an Abortive Measure in Syphilis.** (*Kontralnesin, in der Abortivbehandlung der Syphilis.*) E. KLAUSNER, *Münchener Medizinischer Wochenschrift*, April 14, 1914.

Klausner used Kontralnesin, a preparation recommended by Richter consisting of salicyl, sozodol, quinin, sublimat, arsenic and phosphorus in combination with an important proportion of colloidal, molecular mercury in a series of twenty cases of syphilis during the initial stage. In fifteen cases he also added salvarsan to the Kontralnesin. The number of injections was from five to eight at five-day intervals. Of the twenty cases only five went on to the progressive manifestations of syphilis. The combination of this preparation with salvarsan gave the best results. But Kontralnesin is valuable in all stages of syphilis and can promptly cause the Wasserman reaction to disappear. It is claimed to be harmless for the kidneys and its injection is not attended by pain or disagreeable symptoms.

**Concerning Disturbed Ovarian Function Associating Myomata of the Uterus and Certain Debatable Questions Concerning Myomata.** (*Ueber Störungen der Eierstocksfunktionen bei Uterusmyomen und Ueber Einige Strittige Myomfragen.*) AUGUST MAYER and ERICK SCHNEIDER, *Münchener Medizinischer Wochenschrift*, May 12, 1914.

The Abderhalden test was applied to patients known to suffer from uterine myomata in order to prove disturbed ovarian function. The authors found that out of twenty-seven cases tested against ovarion "ferment," the majority proved positive. The ovary removed at operation was employed in this test. Only 50 per cent. of cases showed a positive reaction when the ovary of other patients with myoma was used in the test. The Abderhalden test is thus drawn upon to demonstrate ovarian dysfunction in relation to myomata. Function and growth of the uterus are both dependent upon the ovary. Be-

fore puberty myomata are uncommon; and in those cases of early myoma growth the onset of puberty may be assumed to be precocious as well. On the other hand after the climacteria period myomata recede in growth and even disappears. Furthermore, anatomically there are distinct macroscopic and microscopic changes in the ovary associated with the majority of uterine myomata. Hence dysfunction of the ovary so often found in these uterine growths may not be regarded as accidental merely, but should be considered as a cause of myoma growth.

**The Value of Radiography in the Surgery of the Urinary Tract.** D. N. EISENDRATH, Chicago. *The Journal of the Michigan State Medical Society*, May, 1914.

The various conditions which can give rise to a shadow to be distinguished from one due to a calculus of the kidney or ureter are best divided into (a) Extrarenal shadows: (1) Calcified area due to tuberculosis of the kidney. (2) Areas of chronic induration of the kidney. (3) Atheromatous patches in the renal artery. (4) Calcified retroperitoneal glands. (5) Areas of ossification in the tips of the transverse processes of the lumbar vertebrae, or in the last costal cartilages or of the last two ribs. (6) Gallstones, pancreatic calculi or calcified areas in a cancer of the head of the pancreas or enteroliths in the appendix. (7) Calcification of ulcerations in the walls of the ureter. (b) Extraureteral shadows: (1) Calcified retroperitoneal or mesenteric glands. (2) Enteroliths in the intestine or appendix. (3) Calcification in the sacro-sciatic ligaments, in uterine myomata, ovarian dermoid cysts, in the prostate or vasa deferentia. (4) Phleboliths in pelvic veins or areas of calcification in the iliac vessels. (5) Calcification in the wall of the ureter.

The author believes that there is no great danger in pyelography provided one ascertains by a preliminary injection with methylene blue solution exactly what the capacity of the renal pelvis is. The collargol should be injected by using gravity as the only pressure.

The shadowgraph catheter is of great use and should be more often employed.

**Gastro-Enterostomy; Experimental and Clinical.** F. A. C. SCRIMGER; E. W. ARCHIBALD; A. H. PIRIE; Montreal, *The Canadian Medical Association Journal*, April, 1914.

A consideration of a number of human cases of gastro-enterostomy and a number of operations on dogs and cats has led the authors to the following conclusions:

1. That the anastomosis in the cardiac portion, with the pylorus open, will, as has been observed by others, allow most of the food to go by the pylorus. It will afford no protection to an ulcer in that situation. More than this, in dogs at least, most of the food leaving by the pylorus re-enters the stomach through the anastomosis, and the animals will not do well; they vomit and grow thin.

2. That the addition of the exclusion of the pylorus will protect an ulcer, but will not greatly improve things otherwise. The stomach will still fail to empty. The animals will vomit and grow thin.

3. That the placing of the stoma in the pyloric portion improves matters enormously. Here food will pass out by the stoma chiefly, though partly also by the pylorus if open. If an ulcer is present, it can be efficiently protected by excluding the pylorus. In both cases the animals do well.

4. That if an ulcer is found proximal to the pylorus anywhere in the pyloric portion, it can still be protected by laying a fascial ligature around the stomach between it and the anastomosis; further, that in animals at least an anastomosis placed in relatively the same position as that necessarily used in the human, if a short-loop operation is done, is much more efficient when the fascial ligature is applied immediately distal to the stoma, than when placed at the pylorus.

**Circumscribed Cerebral Serous Meningitis.** LIONEL E. C. NORBURY, London. *The Universal Medical Record*, March, 1914.

Localized serous meningitis, giving rise to a clinical picture resembling tumor, was first described as occurring

in the spinal cord. A few cases of the affection localized in the cerebellum have been reported, but only four cases of a cerebral localization have hitherto found their way into the literature. The author's case, which is described in detail, is therefore of considerable interest: A child aged thirteen months had an attack of convulsions followed by right facial weakness and tremor of the right hand. Two months previously the child had a slight discharge from the right ear and a small abscess in the neck had been opened. Examination showed a tremor of the entire right side, right facial paresis and convergent strabismus. The condition not showing any improvement, it was decided to trephine over the left Rolandic area. At operation there was no sign of extradural hemorrhage or of pus. The pia-arachnoid was swollen and edematous and brain pulsations were but feebly transmitted. On account of a sudden laceration of a blood-vessel and a sharp hemorrhage, the condition of the patient necessitated a rapid closure of the wound. The wound healed by primary union, and by the ninth day there was no longer any sign of tremor. Two ounces of clear cerebrospinal fluid were evacuated by a small incision in the scar. Three times after this the same procedure was gone through. The child's condition improved steadily so that a year and a half after the operation he was normal in every way and there was no protrusion at the site of operation.

**Cecopexy by Fixation of the Cecum to the Psoas Parvus.** (*Technique Opératoire de la Cecopexie [Fixation du Caecum au Tendon du Petit Psoas]*). P. DUVAL, Paris. *Revue de Chirurgie*, May 10, 1914.

Several methods have been employed for the fixation of a mobile cecum. The chief ones are: 1. Fixation to a peritoneal pocket in the lateral iliac region. 2. Attachment to the posterior parital peritoneum. 3. Fixation to the peritoneum in the parieto-iliac angle. There is a considerable proportion of failures following all these methods. Duval, therefore, determined to fix the cecum to a firm and comparatively immobile structure and has had perfect results in a number of cases by employing the following technique: A large McBurney exposure is made, the musculature being incised as well as divided when necessary. After removal of the appendix the ileocecal junction is elevated and the posterior peritoneum underlying it is longitudinally incised. The psoas parvus is thereby exposed. When this muscle is absent, the inner border of the psoas magnus is employed. Several sutures are passed, taking broad grasps of the under surface of the cecum on the one hand and the musculature on the other. The only structure to be borne in mind in the dissection is the iliac artery. After the sutures are tied the two flaps of posterior peritoneum are sutured to the lateral aspects of the cecum. If cecoplication is thought necessary, this is done before cecofixation is practiced.

**Results of Radium in Cancer.** H. H. JANEWAY, New York, *Journal American Medical Association*, May 30, 1914.

H. H. Janeway, New York (*Journal A. M. A.*, May 30, 1914), reviews the results of treatment of cancer by radium, noting the work of Wickham, of Paris, which seems to indicate that while the influence of radium on all types of cancer is a favorable one, it does not extend to the limits of the disease in any but the most superficial forms. Wickham's works cover 1,000 cancer cases thus treated. The work of the Radium Institute of London covers 460 cases of cancer during 1912, none of which are reported as cures, though some of them may later prove to be such. Out of 101 cases of slow growing benign forms of skin cancer, 31 patients were apparently cured for the time and 41 improved. But in cancer of the rest of the body there were only 15 apparently cured. The results also confirm the observations of Wickham. The less extensive test of radium in cancer at Vienna led to the same general conclusions. While Wickham's reports show some enthusiasm, the German reports are very conservative and the London Radium Institute is non-committal. All, however, show a remarkable agree-

ment as regards results. While radium will destroy cancer tissue in a dosage not affecting normal tissues, it does not cure the disease unless the cancer is quite superficial or of a very susceptible type. We may cherish a hope that greater success may be had in the future, but at present radium can only supplement the knife.

**Can the Gamma-Ray of Radium be Produced Artificially in the X-Ray Tube?** (*Lässt sich die  $\gamma$ -Strahlen des Radiums künstlich in Röntgenröhren Herstellen?*) FRIEDRICH DESSAUER, *Münchener Medizinischer Wochenschrift*, May 5, 1914.

Dessauer claims that through the recent perfection of the X-ray machines we have come in possession of the agency of an artificially produced gamma-ray which has from ten to fifteen times the power of penetration of similar rays produced in the ordinary machines; and that for practical therapeutic purposes this gamma-ray is almost identical with the gamma-ray of radium. It has the decided advantage of accessibility owing to its greater cheapness and also in its universal applicability.

**Multiple Subcutaneous Tuberculosis Following Circumcision and Treated by Tuberculin** S. T. CHAMPTALOUPE, New Zealand, *British Medical Journal*, April 11, 1914.

Shortly after circumcision done in the seventh week, the child developed many subcutaneous abscesses which did not heal after incision. Both iliac glands also had suppurated. Examination of the pus showed tubercle bacilli. When the child came under observation, ten months later, emaciation was profound. The entire body was the seat of numerous superficial abscess and scars, and the child appeared hectic. Promptly after the administration of tuberculin, the wounds healed, the child improved, and at present is in perfect health. It developed later that the physician who performed the circumcision was suffering from laryngeal tuberculosis.

**Hyperneurotisation, Muscular Neurotisation, Free Muscle Transplantation. Experimental Studies.** (*Hyperneurotization; Muskuläre Neurization; freie Muskeltransplantation.*) P. ERLACHER, Gray, *Zentralblatt für Chirurgie*, April 11, 1914.

Erlacher reports a series of animal experiments which suggest many practical possibilities. The motor nerve of the biceps was divided and transplanted into another site. The functional result was perfect. The ulnar or median nerve was divided and the end was transplanted into the biceps. At the end of a few weeks electrical reactions showed that regeneration was complete. Erlacher also performed a long series of experiments in which portions of muscle were transplanted into other muscles. In some instances the transplantation was free; in others the transplantation was through a pedicle. The transplants were inserted both in normal and in artificially paralyzed muscle. In every instance the transplanted muscle healed in situ and retained its function. The application of these principles to the cure or alleviation of various forms of paralysis is obvious.

**Experiences With Spinal Anesthesia in Pelvic Surgery.** B. M. ANSPACH, Philadelphia. *American Journal of Obstetrics*, May, 1914.

From an experience in seventy-two cases, Anspach concludes that even in expert hands, spinal anesthesia will have a higher mortality as a routine than ether, chloroform or nitrous oxide, although it has no post-operative mortality or morbidity in which respect it is superior to the ether, chloroform or infiltration anesthesia, but is not superior to nitrous oxide and oxygen in this respect. It is more troublesome to the surgeon than the inhalation anesthetics. It should be used only after the surgeon has familiarized himself with all the details of the technic; he should also be cognizant of possible complications and how to meet them instantly. Well given, it is the best form of anesthesia in selected cases, and should be resumed for those operations in which the dangers of general anesthesia are increased or in which local anesthesia or nitrous oxide and oxygen are unsuitable or satisfactory.

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## AN ADDRESS IN SURGERY. PROGRESS IN GENITO-URINARY SURGERY.\*

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I thought that perhaps it would be well to make the subject of this talk: "The Recent Development and Progress Made in Certain Portions of Genito-Urinary Surgery"; for instance, *Cancer of the Penis*. Surgical attitude has changed toward this in the last few years. At first we had only amputation, which did practically no good, except in the very early stages. Then we swung to complete emasculation. Not only was the penis removed as far back as possible, but also the testicles and scrotum on both sides, and the glands of the groins. Results have shown that this mutilation is entirely unnecessary.

A recent study of thirty cases in our service seems to point out certain facts to which I would like to direct attention. In those cases where simple amputation was done without removing the corpora cavernosa, etc., recurrence has not occurred in the stump, but in the groin, and in cases where the glands of the groin and amputation of the penis has been carried out without removing the testicles and carrying the urethra back into the perineum, it was also in the glands of the groin, or even deeper, that the recurrence occurred, so that it is not necessary to do the very extensive emasculating operation (castration and excision of bulbous urethra).

My recent studies have shown that the most important thing is to remove the tissues in one piece—penis, prepubic fat, and ligaments and tissues of both groins, including fat and glands. The groin incisions should start well out toward the anterior superior spine on each side and curve downward to the root of the penis. It is wise also to begin at the outer end of each groin and free these structures first, working toward the penis, amputation of which occurs last. In this way the deep lymphatic connections with the body are divided first and the chances of forcing cancer juices into the system from operative pressure are minimized. It is best

to follow Poupart's ligament to the saphenous glands, and then ligating the saphenous vein, cleaning out the whole fossa, and following down a short distance into the scrotum and spermatic cord, then removing all the tissue in front of the symphysis pubis including the suspensory ligament. In this way the lymphatic system from the cancer on the penis to each groin is removed in its entirety, and the chances of a cure are exceedingly good, even in cases where you find a few glands enlarged in the groins. Some of our cases we have followed for over ten years, and they show excellent results.

Another interesting fact is that an amputation, even as extensive as I have indicated, does not interfere with copulation. Patients in whom the penis had been cut off short at its base, have reported that not only was it possible to have erections of the remaining portion and to go through with that act, but also to have fairly satisfying ejaculations.

Of these thirty cases, eleven were apparently hopeless at the time of operation, so that nothing but a very simple operation was attempted. Three of them were only partial, and three patients died of infections. Out of the thirty we have apparently thirteen cases cured. Various observers have shown that the majority of cases of cancer of the penis occur in persons with a long foreskin. In a man past forty-five years of age we should be very suspicious of ulcers which are not cleared up under ordinary treatment, and more or less suspicious of any long-continued suppurations in cases with long foreskins that cannot be retracted. If diagnosis is not evident a section should be removed, if possible, by electro-cautery, so as to sear the bloodvessels. Sometimes partial or complete amputation is all that is necessary, but if that is not sufficient, then simultaneous one-piece removal of the glands of groin and prepubic tissues with the penis, as suggested above, is the operation of choice.

Another interesting subject is *cancer of the prostate*. Up to a few years ago this was thought to be rare. About ten years ago, Albarran startled the surgical world when he reported that fourteen per cent. of the cases which he thought to be benign prostates had proved to be cancerous. In our clinic in Baltimore about twenty-two per cent. of the cases of obstruction in old men are due to carci-

\*Address delivered before the New York and New England Association of Railway Surgeons, October, 1913.

noma. One in five of the cases that come to be treated for hypertrophied prostate is carcinoma. So you see that it is a very common condition, far more so than has been appreciated by the profession. It is one, however, in which an early diagnosis can often be made.

A study of our cases, however, shows that one cannot depend upon symptoms to make the diagnosis. For instance, the text-books say that hematuria is a very common symptom. That is not true. It is more common in hypertrophy. Pain, also, while more common in cancer than in hypertrophy, does not, as a rule, come until late in the disease. Our hope comes from early diagnosis, and our only prospect for that is to include rectal palpation in every physical examination. Osler used to say that no man can be entrusted to make medical diagnoses who cannot interpret a rectal palpation. The most important point in early diagnosis is induration. I wish to lay great stress on the presence of induration in the prostate, as examined by the rectum. The patient may have no obstruction, but where it is not an evident case of old gonorrheal prostatitis—that can generally be recognized or excluded—the presence of induration should be viewed with suspicion. Then, too, the induration in carcinoma is entirely different from that in gonorrheal prostatitis. It is more stony; far harder; often has an irregular edge, and does not occupy the whole prostate at first, although it may do so later.

Our pathological studies have shown that if we are going to hope for a radical cure of carcinoma we have to employ a radical procedure that includes all of the tissues that are progressively invaded by the carcinoma—the whole of the prostate, with its capsule, its urethra, a cuff of the bladder, including most of the trigone and the seminal vesicles and the ampullae of the vasa differentia. This disease does not often travel into the bladder, but into the region between the seminal vesicles, and the very strong posterior recto-vesical fascia prevents its getting into the rectum, so that rectal involvement in carcinoma of the prostate is rare and then occurs very late. In over 200 cases I have seen it only three or four times.

The operation, which is not very difficult, follows the technic of my perineal prostatectomy until the prostate is drawn down and exposed. If you are uncertain as to malignancy, it is sometimes possible by palpation to make certain. If after that you are still uncertain, it is a very easy matter to remove a piece of the prostate with a Paquelin cautery and have a frozen section made and stained, and make a diagnosis while the operation is halted. In

a recent case where a diagnosis of probable carcinoma of the prostate was made, it contained only one nodule. I was quite uncertain, and thought it advisable to excise a piece. Microscopic examination of the section showed carcinoma, and we then carried out the rest of the operation, viz., transverse division of the membranous urethra, freeing of the anterior and lateral surfaces by blunt dissection, incision into bladder just above juncture with prostate, separation with scissors of bladder from prostate leaving a cuff of bladder attached to prostate and dividing the trigone just below the ureters, freeing the seminal vesicles by blunt dissection, division of the vasa differentia as high as possible and removal thus of the entire prostate with seminal vesicles and cuff of bladder in one piece. The operation is completed by anastomosing the open wound of the bladder with the stump of the membranous urethra, and draining the bladder with a catheter.

It is not a difficult operation. The incision is the same as for an ordinary prostatectomy, except that the skin incisions should be a little longer, and the levator ani muscles are not divided.

We had an interesting discussion on cancer of the prostate at the International Congress in London this summer, and about twenty cases in which this operation was carried out were reported by various surgeons. I can now collect about thirty cases with a fairly large per cent. of apparent cures—several followed over five years.

There is no doubt that a cure can only be obtained by a radical operation, and no operation can be radical unless it includes the area I have described—the whole prostate, the cuff of the bladder, the seminal vesicles, and ampullae of the vasa differentia, removed in one piece as shown.

To repeat: Early diagnosis is the important thing, and we should remember that rectal examinations should be made part of the clinical study of every medical case, and we should always be suspicious of induration in the prostate, even though it be of limited extent, and the patient may not have any symptoms which make us suspect the presence of cancer.

Through the same inverted U perineal incision—going back of the triangular ligament—it is possible not only to operate for benign hypertrophy and malignant involvement, but also to *expose the seminal vesicles* without opening the urethra. For this purpose I employ a long slender prostate tractor which can be passed through the meatus, thus avoiding the incision into the membranous urethra. By using this instrument, as a lever (the triangular ligament

and symphysis pubis being the fulcrum), it is possible to bring down the seminal vesicles, so that after division of the fascia covering them, the seminal vesicles are fully exposed to view, and may be incised, or excised partly or completely as may be desired.

In some cases it may be necessary to slice off the whole posterior surface to get proper drainage. In others it may be desirable to excise the seminal vesicles—as in tuberculosis or severe inflammatory conditions. It is not necessary to divide the levator muscles, as in Fuller's operation, and you can see what you are doing.

Another thing, which is interesting in *traumatic surgery*, is that this same incision is useful for exposing the posterior urethra in fracture of the pelvis. I recall a case in which the prostate was torn off from the triangular ligament, pushed upward by a large blood clot, and occupied a position eight inches higher than the normal. It was easy to grasp it and draw it down and unite the two ends of the ruptured membranous urethra. The patient had no stricture following.

Another class of cases in which this same incision may be used is *severe impermeable stricture of the urethra*. In perineal operations for stricture one usually exposes the urethra through a median incision and tries to pass some fine instrument into the bladder. In case you cannot get in fairly promptly, in order to avoid a considerable amount of traumatism and possibly resulting incontinence, it is a very easy matter by continuing the median incision back on each side (thus making it an inverted Y), to expose the membranous urethra, incise it longitudinally, and then to pass a sound, retrograde, toward the bulbous urethra and divide the stricture upon the end of the sound. This method is more simple than a suprapubic retrograde catheterization, and is often of great value in demonstrating the urethral lumen and the extent of the stricture.

The subject of *prostatectomy* is too commonplace to warrant discussion here. Suffice it to say, after an experience of about 700 cases, and a mortality rate of less than four per cent., I consider the perineal operation the safer, and most satisfactory from the patient's standpoint.

In regard to *extravasations*, which are often seen with traumatisms of the perineum or fracture of the pelvis, the various fascias play a very important part, and serve as an excellent guide to the site of the rupture. If the rupture is external to the triangular ligament, extravasated urine and blood escapes beneath Colles' fascia, which is bounded by

the triangular ligament posteriorly, the ischio-pubic rami externally, and incloses the bulb and other structures of the perineum, and also the scrotal contents. In such cases you will find not only the perineum but the scrotum distended with urine, and sometimes that it has traveled up beneath the superficial fascia of the abdomen. Where you find a perineal, scrotal, and possibly abdominal swelling, you know at once that you have a rupture in front of the triangular ligament. If the rupture occurred immediately back of the triangular ligament the extravasation would be in front of the bladder and of the peritoneum, and might extend well up toward the diaphragm. If, however, the rupture lies farther back and involves the transverse recto-vesical fascia, extravasated urine often travels back behind the peritoneum and up to the region of the kidneys. A knowledge of these fascias therefore will at once show how extensive an operation will have to be done.

In a case the other day, we found that the extravasation was not only in front of the bladder but reached the kidneys on each side. Incisions in the suprapubic, iliac, and lumbar regions (five in all) were required. Another case of rupture occurred into the peritoneal cavity from a ruptured posterior bladder wall. A laparotomy showed free urine in the abdominal cavity and also beneath the peritoneum on each side of the pelvis. These collections of fluid were opened from within and all drained through the laparotomy wound.

A subject concerning which very great progress has been made in recent months is *tumors of the bladder*, both cancers and papillomata. In a recent study of 118 cases of bladder tumors I found that most cases of benign papillomata of the bladder treated by excision recurred promptly and nearly always ultimately became malignant. Through the development of electric methods of treatment, such as that with the currents of Oudin or d'Arsonval, whereby a high frequency current is delivered by an electrode passed through a catheterizing cystoscope, or through guttapercha sounds (such as I have had made for the use of large currents), it is now possible to apply a high frequency spark to a benign tumor and cause it to absolutely disappear. This is one of the most brilliant recent advances in surgery, and has brought a hopeless group of cases into the domain of successful surgery. Any one who nowadays does a cutting operation on a benign tumor of the bladder is doing wrong, for he is very likely to get a recurrence, and, ultimately, a carcinomatous recurrence. If they are very extensive, the electric sound can be turned into the region in-

volved, and an important fact is that the patient does not usually feel any pain if it is directed toward the tumor, but if directed toward the bladder, pain is experienced at once by the patient. In this very simple way it is possible to know when you are on the tumor and when not.

To show how very effective the high frequency spark can be, I had a case where the left half of the bladder was covered with tumor masses, seven in all, and each as big as a hen's egg, and the case looked absolutely hopeless. Radical operation was out of the question. That man, after various treatments over a period of six months, has been well for a year. The half of his bladder which was so extensively involved now appears absolutely normal.

It is very important to know whether you have a benign or a malignant case. Cystoscopically you cannot be sure by simple observation alone, so it is very important to get specimens for microscopic diagnosis. By means of an instrument which we have now (cystoscopic rongeur), you can remove a large portion of the tumor for microscopic diagnosis, and perform the radical operation if it proves malignant. In doing suprapubic work in these cases it is very essential that you take every care to avoid implantations. It is very easy to knock off a small particle which can drop into the wound. You should also avoid traumatism from retractors. It is important to have a wide opening; to have the bladder filled with air; to have the urine drawn out by a suction apparatus so as not to break off or wash away any villi, and if possible to cauterize the surface of the tumor, before you start on the resection, with Paquelin or electro cautery applied over the surface, or by the use of resorcin. Your excision should include the whole bladder wall. We followed very carefully the subsequent course of our cases and find a good number of cases treated by resection of the bladder wall without recurrences, while the cases treated by clamping the pedicle and excising beneath it close to the bladder have almost all recurred.

A very important thing is to be suspicious of all cases of hematuria. It may come from a slight prostatic enlargement; it may come from a varicose vein in the bladder, but it is important that all these cases should be diagnosed early, and as hematuria and pain are often early symptoms it is very essential that early cystoscopic examinations should be made when it is usually so easy to make the diagnosis in this way.

The same is true of *tumors of the kidney*. As you know, they are usually associated with hematuria, often with no other symptom; occasionally with

colicky pains; sometimes on the side opposite to the one involved, but often none at all, only hematuria. These cases should be investigated early. Tuberculin tests will eliminate or establish tuberculosis. Ureteral catheterization and the use of the new functional tests are valuable in comparing the kidneys. The phenolsulphonephthalein test is especially valuable and ought to replace many of the present methods. It is one of the best means of determining when a patient can be given an anesthetic with safety. It shows the functional value of the kidneys, and it ought to be generally adopted, for it is simple and effective.

The pyelograph, which usually shows marked distortion of the renal pelvis in tumor cases, is of great diagnostic value, but collargol must be used very carefully and allowed to flow in by gravity.

By these methods, which may be called laboratory methods, but which can be easily carried out by most practitioners, the early diagnosis of kidney lesions is much facilitated, and we may look forward to better results. Heretofore the results obtained in renal tumors have been rather bad, and the tumors have usually recurred. I think that often pressure upon the tumor is made too violently during operation, resulting, I believe, in forcing metastases producing material into the circulation. This should be avoided, and one should get a wide exposure and divide the pedicle as soon as possible. The possibility of doing this early is the principal advantage of the intraperitoneal operation for renal tumors.

In *stricture of the urethra* much advance has been made. A few years ago external or internal urethrotomy were generally thought to be necessary, and in the teaching of Otis most cases were so treated. With a French filiform bougie and dilating follower, it is possible to get through almost any stricture, and generally to cure them without any operation except progressive dilatation. It is very essential that the kit of every surgeon should contain these delicate instruments. Many a man who has stricture with complete retention of urine can be easily relieved without operation if you have a fine filiform and a soft catheter which can be attached to it.

Another recent development in surgery is in the treatment of *stricture at the vesical orifice of the urethra*; that is, in the prostatic portion. Until a very few years ago it was thought that stricture of the prostatic urethra did not occur. It is true you do not often find it in hypertrophy, but in chronic prostatitis you will frequently find a narrowing of the prostatic orifice, which has been described by



the elder Keyes as contracture of the neck of the bladder, and by Mercier as a valvule. This condition is one which is generally overlooked. It may occur in quite young men; it has not infrequently been present from birth, or come on in early youth—the patient having always appreciated that there was obstruction to urination present, and micturition often being so unsatisfactory that several attempts were necessary to apparently empty the bladder, and generally being associated with frequency of urination. These cases show either a small bar in the median portion of the prostate or a contracted orifice with definite fibrosis of the internal sphincter, or a small muscular or glandular hypertrophy. When examined suprapubically they have a tight orifice that you cannot get your finger into. It is possible to pass instruments and dilate from the meatus, but the obstruction usually recurs promptly, and the dilatations do not do any permanent good. Fuller, some years ago, suggested a division through the perineum, and I have seen some good results from that line of treatment. Chetwood has used a modified Bottini. A better procedure is, I believe, my "punch operation." The punch consists of a No. 29 F. tubular instrument with a fenestra near the inner end, which can be passed in until the prostatic bar drops into the fenestra, where it can then be excised and removed completely by an inner cutting tube or punch. It can be used posteriorly as well as anteriorly. After the operation a small blood clot will sometimes obstruct urination, and it is necessary to have large evacuating condé catheters and a good plunger syringe to evacuate a clot that might occur. I have now used this operation in 125 cases without a single death, and with very satisfactory results. It is of value only when the obstruction is solely at the vesical orifice, with no lateral enlargement present, and is therefore limited to a narrow series of cases which should be very carefully differentiated. Owing to the very careful after treatment required it is not an operation for general adoption.

This merely suggestive outline has perhaps given some idea of the accomplishments of genito-urinary surgery in recent years. Other things, perhaps more important than these that I have touched upon, have been done. I have not mentioned the really marvellous progress made in the development of the cystoscope (the simple, the operating, the ureter catheterizing, the fulgurating, the photographic, and the litholapactic cystoscopes), with the use of which each day records more wonderful achievements.

Nor have I even referred to the splendid achieve-

ments of urethroscopy with which many deep-seated and previously unrecognized conditions which have tortured mankind and driven thousands into neurasthenia, are now easily cured. The skiagraph and pyelograph have also been passed over. It must suffice to make mere mention of these instruments and the newer laboratory methods of diagnosis which have brought urology from one of the most uncertain and obscure branches of medicine to one of the most accurate and satisfactory from a surgical standpoint, as shown by the reduction of mortality in prostatectomy from twenty per cent. to three per cent. and nephrectomy from thirty-five per cent. to two per cent. in the last twenty years.

### SOME PROBLEMS IN THE SURGERY OF THE KIDNEY.\*

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These problems concern both diagnosis and surgical treatment. The kidney is injured subparietally more than any other organ. Though the laceration communicates with the calices or pelvis in the majority of cases, rupture of the kidney is uncomplicated in injury of other viscera or of the peritoneum in eighty per cent. of cases, according to Watson's tables. The torn surface of the kidney does not cause extravasation of urine; the latter is only due to a rupture opening the pelvis or calices.

In rupture of the kidney the diagnosis of the condition is, as a rule, easy from the history of the injury, blood in the urine, and a tender mass in the kidney region. If a catheter is passed, all the fluid injected is evacuated excluding the rupture of the bladder, as a rule. The diagnosis of the degree of the rupture is not so easy, but may generally be inferred from the severity of the injury, the condition of the patient, and the size of the perirenal extravasation.

I am inclined to treat these cases expectantly unless I strongly suspect a severe rupture, and provided there exists no infection of the urethra or bladder. As a rule, there is little danger from the hemorrhage *per se*; the danger lies in the possibility of infection, and this can be minimized by at once giving urotropin, in frequent large doses, at least ten grains every four hours, which should be done in all cases. Though suppuration occurs more readily when urine and blood are extravasated together than when either are extravasated separately, I have but once been compelled to operate by the

\*Read before the New York and New England Association of Railway Surgeons, October, 1913.

occurrence of the general signs of infection which was found to be slight and did not interfere with a smooth recovery. Operation with drainage on the third, fourth, and fifth days give as good results as immediate operation. I do not wish to be understood as advising against early operation in all cases, but only in cases of moderate severity which in my experience form a large majority of cases. Of course, when there are signs of rupture of the overlying peritoneum, of other abdominal injury, of a severe rupture or profuse or continued hematuria, early operation is essential.

Moreover, when the kidney is exposed and a moderate rupture found, suture of the tear, including the capsule, should be made and not nephrectomy, for remarkable repair of renal tissue is shown to occur by experiment and clinical observation, and wounds of the kidney heal more readily if the capsule is sutured.

*Bullet wounds* of the kidney differ from traumatic rupture by reason of the fact that the peritoneum is far more often involved in the lesion due to a bullet; in fact, it is the rule.

In bullet wounds of the kidney it is important to drain the track of the bullet through the kidney as well as the perirenal tissue through a lumbar opening. In most cases abdominal exploration is essential to find and treat wounds of other organs and of the overlying peritoneum. If possible the anterior opening of the kidney should be closed by a purse-string suture or at least the opening of the peritoneum in front. In a recent case drainage of the tract and the retroperitoneal tissue proved sufficient. In this case there were three bullet wounds, one perforating the kidney, there were two holes through the diaphragm and pleural cavity, the spleen was grooved, and the stomach grazed by the bullets. The patient recovered. In another case of multiple wounds of the intestines and liver, imperfect drainage of a wound of the kidney led to a fatal result.

It seems strange that an early or an earlier diagnosis of renal tuberculosis should not be made than appears to be the case from the time when these cases are referred to the surgeon. The importance of this lies in the fact that the proportion of those who are well or much improved after nephrectomy is far greater in the early cases than in those where the symptoms have existed more than one or two years.

Diurnal irritability of the bladder, with moderate pyuria and slight hematuria with an acid urine, should at once suggest renal tuberculosis. By diurnal irritability we do not mean that there is no nocturnal, but only to distinguish it from prostate

trouble in which the irritability is nocturnal. There are many cases of diurnal irritability without pyuria, especially in women, which are not tuberculous in origin and appear to be a form of neurosis. Other cases are due to some form of cystitis. Given the above form or diurnal irritability, tuberculosis should be looked for, as it can be found in practically every case by repeated examinations. If not found, guinea pig inoculation has proved positive in one or two cases in my experience, but it takes time. A cystoscopic examination should always be made, as a tuberculous bladder is usually recognized by a competent cystoscopist and this also leads to the *localization* of the process which is most important and sometimes most difficult. What we expect of the cystoscopist is to determine: (1) whether the bladder condition is secondary to the kidney or the prostate or epididymis; (2) whether one or both kidneys are involved; (3) which kidney is diseased; and (4) the function of the other kidney. A recent experience demonstrates the occasional difficulty of this localization and shows how much we have come to depend on the cystoscopist.

A young man of seventeen was referred to me last spring with all the above symptoms of renal tuberculosis with very numerous bacilli in the urine. On cystoscopy the bladder was found in an unusually advanced stage of tuberculosis. It was impossible to catheterize either ureter, and both ureter mouths appeared markedly diseased. The bladder was treated for some weeks with iodoform in olive oil and gomenol, with some relief to the patient, but no change in the result of the secondary cystoscopy. Bilateral renal tuberculosis was suspected, but as an only hope both kidneys were exposed, the left was found healthy, the right markedly diseased, and was removed. He made a good recovery, but subsequently died of tuberculous meningitis.

Given the diagnosis and the localization of the lesion in one kidney, the treatment should be simple, *i.e.* nephrectomy, provided the other kidney is healthy or at least functionally so. The frequent and often fatal delay in recommending operation appears to be due to the false impression prevalent that renal tuberculosis may be cured by other means than surgical, *i.e.* climate or the use of tuberculin. Tuberculin is a waste of time and according to Israel should not be used even in the very earliest stage. Climatic treatment gives an enormous mortality. Out of seventy-one cases at the Mayo clinic not operated upon, forty-eight were traced and only three were free from bacilli and vesical symptoms. Out of 316 cases treated in Switzerland non-surgically and collected by Wildbolz, only ten per cent.

lived over five years, only five per cent. had no symptoms over five years, and only one case was well in every respect.

But absence of bacilli in the urine and of vesical symptoms does not mean cure of the tuberculosis. The cystoscope often demonstrates absence of secretion from the affected kidney and the operation reveals the ureter blocked and the kidney necrotic and filled with caseous or purulent substance, a menacing source of infection. The danger of infection in a more or less latent case of renal tuberculosis was illustrated in a recent case operated on, where a left renal tuberculosis remained inactive after a long period without operative interference. Operation revealed the cause of a large tender tumor in the left upper quadrant to be a very large tuberculous and adherent spleen which had undergone some softening anteriorly. If any early nephrectomy had been done and this source of infection removed, a tuberculous infection of the spleen would in all probability have been avoided.

But few, if any, specimens of healed tuberculous kidney are found, while they should be not uncommon if spontaneous recovery is common.

Even when the patient is able to carry out climatic treatment in an ideal way, it does not seem to cure. The bladder symptoms improve or even disappear, and the patient is nearly normal, but the kidney is still a menace. I watched such a patient for about eight years. Finally, when he seemed practically well, a mixed infection of the diseased kidney occurred, necessitating nephrectomy. Though he improved for a considerable time, he finally died of a generalized tuberculous process, in which the intestine and finally the opposite kidney were chiefly involved. I feel now that climatic treatment in renal tuberculosis is not only a waste of time, but an unnecessary risk, in delaying the only proper treatment.

Is partial nephrectomy ever permissible? Personally, I believe not. I had a case last summer where only one pole of the kidney was apparently involved, but in removing the kidney the mucosa of the kidney pelvis was much involved, and this I believe is the rule in patients coming to operation. As renal tuberculosis is commonly of hematogenous origin, a partial nephrectomy might suffice if we could operate at a very early stage. But in my experience the diagnosis is seldom made and the patient referred for operation before the pelvis is involved in the lesion. In hematogenous septic infections I have done a partial nephrectomy with a good result.

I have had little or no personal experience with

the problem of operating in the presence of tuberculosis of the other kidney. But apart from the fact that this is almost always a late stage and is seldom seen in an early case, such patients are found to improve greatly on the removal of the first or primarily involved kidney, provided the other kidney is functionally competent. The functional examination of the sound kidney by one of the color test methods, in addition to the urea determination, is an important method of examination that it is well to apply in all cases, though it is not essential in every case.

I do not consider it necessary to remove the ureter way down to the bladder as a routine. Cauterization of the stump with pure carbolic and often the injection into the lumen of a few drops of the same solution, seems to fulfill all requirements. I have, in a very few cases, tried the Mayo method of filling the cavity left by the removal of the kidney with salt solution and suturing the wound without drainage. In one case, after primary union, the wound reopened and a tuberculous fistula developed.

The diagnosis of renal and ureteral calculi has been made much more easy, simple, and certain by the use of the *x*-ray. This presumes that the radiograph is made by an expert with a satisfactory apparatus. In the absence of these conditions the *x*-ray may be more of a hindrance than a help. Even under ideal conditions the *x*-ray may fail us, in spite of repeated trials. I have seen a few samples of this when operation has proved the failure of the *x*-ray. In one case there was a history of passing gravel or small stones some years before, which the *x*-ray failed to show. The present attack, with typical symptoms and urinary findings, had lasted several weeks, the kidney had become enlarged and tender, and the temperature indicated beginning infection. Repeated *x*-rays, taken by an expert, were most satisfactory, but showed no stone. Operation disclosed a stone in the upper ureter, with pus dammed back in the pelvis of the kidney. The removal of the stone was followed by a cure.

A previous case, referred with the diagnosis of acute appendicitis, was diagnosed as ureteral colic. The *x*-ray taken by one of our best *x*-ray experts was declared negative. In five days he passed a small stone and all symptoms ceased.

Last summer I removed a stone from the bladder fully one and one-half inches in diameter, which was diagnosed by the cystoscope after very satisfactory *x*-rays failed to show a stone.

Most surgeons have had similar experiences,

which are usually explained by the fact that stones of pure uric acid fail to show a shadow. My own feeling is that there are many more cases of renal calculus that fail to give an *x*-ray shadow and are therefore refused operation. Especially in hospital practice I have seen several cases in which the history, symptoms, and signs point strongly to renal or ureteral calculus. Usually there have been several attacks at varying intervals. Perhaps every typical symptom is not present, but the great majority are, and the *x*-ray is negative. Bacteriological examination of the urine is negative, excluding pyelitis. We usually refuse to operate on these cases, but tell them to return if they have another attack. Some of them, I presume, have calculus, but in the absence of severe, long-continued, and disabling attacks, or of infection of the affected kidney, it is better to delay and observe them than to operate perhaps unnecessarily.

With the addition of so many outside aids to diagnosis we are apt to neglect the importance of the clinical diagnosis. For some it is all there is to depend on; for others it is safer than the available laboratory methods; and for all it is of the highest importance and may save us from unpleasant mistakes. The most common of these mistakes concerns the differential diagnosis between appendicitis and renal or ureteral calculi. One such case, where the *x*-ray failed but the clinical diagnosis seemed and proved to be certain, has been referred to. Like most surgeons I have removed calculi in patients who had had the appendix removed for the same symptoms; and, on the other hand, I have removed the appendix when the real trouble was calculus, and have learned from both experiences to be more careful in the different diagnoses. When the history, symptoms, and signs are not typical of appendicitis, it is well to have an *x*-ray to exclude a possible urinary calculus. There is no one symptom or group of symptoms that will clearly differentiate one from the other. Frequent micturition and hematuria, often a microscopic hematuria, are characteristic of calculus, but have been observed in some cases of appendicitis, especially in very acute cases, less often in the subacute ones that are more often difficult to differentiate from calculus. The pain or "colic" in the calculus is usually more sudden in onset, intense and intermittent, but some cases of true appendicitis simulate calculus in the severity of and colicky character of the pain. On the other hand, inflammatory symptoms, rise of temperature, pulse, and the leucocyte count are the rule in appendicitis, but do not occur in calculus disease until later, from the occurrence of infection.

However, any one or all may exceptionally be wanting in an acute or subacute appendicitis. Nausea may occur in both conditions, but vomiting more often with appendicitis; the absence of vomiting, however, does not exclude appendicitis. Tenderness occurs with both, while rigidity is characteristic of appendicitis, but may occur during the paroxysms of renal or ureteral colic. Between the attacks of colic, a patient with calculus may be quite comfortable and does not look so ill (unless worn out by loss of sleep), as a patient with acute appendicitis. The peculiar radiation of the pain to the tests, penis, vulva, thighs, etc., may distinguish a case of calculus, but is by no means usually present. Given a suspicion of urinary calculus or a doubt as to appendicitis, an *x*-ray should be taken to help the differentiation.

In operations for renal calculus, with infection of the kidney, the question often arises shall we do a nephrectomy or a nephrolithotomy with drainage. If there is no contraindication, nephrectomy will lead to a surer and speedier cure. But nephrolithiasis, especially in these old chronic cases, is often bilateral, so that before doing nephrectomy we must make sure that the other kidney is free from stones and infection. In one such case I found the kidney in question was the best of the two, by means of ureteral catheterization and urinalysis of the separate urines. I was surprised in this case to see how well the patient did with two damaged shells of kidney tissue. Though she required many operations from time to time, she lived seven years and most of this time was well enough to do the housework for her large family. Though only a shell of kidney tissue is present, it may sometimes be worth saving. The principal drawback in such cases is the likelihood of recurring lumbar fistulae, sometimes open and sometimes closed.

In the removal of renal calculi I prefer to do a pyelotomy rather than a nephrotomy if the stone is in the pelvis. Mayo has emphasized the fact that if we leave and suture the overlying fat, the wound of the pelvis heals readily. Though I have never had serious hemorrhage from a longitudinal incision of the kidney, I have recently used the transverse incision of the kidney where the stone could not be reached by a pyelotomy, as such an incision often damages less kidney tissue than the longitudinal incisions.

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If a frightened or refractory child will not open its mouth, pass a probe between two teeth and back to the palate. Instantly the mouth will open and a gag may be slipped in.

## THE DIAGNOSIS OF STRICTURE OF THE SMALL INTESTINE BY AID OF THE X-RAYS.

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The  $x$ -rays have proved a distinct help in the diagnosis of strictures of the stomach. The contrast meal reveals any changes in the form of the stomach, its width and its tonus, and its peristaltic movements; it shows how many hours are needed to digest its contents, and by the irregularities of the contours of the bismuth shadows we see the seat and the dimensions of any stricture, due to a malignant growth or an ulcer scar. In the same way the Roentgen rays have long been used as a welcome aid in the diagnosis of strictures of the colon; here the contrast meal and the contrast enema supplement each other and have often revealed a stricture that otherwise could not be detected. Strictures of the small intestine have only recently become an object of  $x$ -ray examination, though here, too, they may be of invaluable help, just as in any other part of the digestive tract.

Holzknicht<sup>1</sup> was the first who described the characteristic signs of duodenal stricture in the  $x$ -ray examination. Observation under the fluoroscopic screen reveals in normal cases an intermittent discharge of bismuth, visible only in the horizontal part of the duodenum, whereas in cases of stricture the gut is dilated and permanently filled up to the point of stricture. In some cases even the stomach itself may be dilated. The muscular wall of the duodenum contracts intensely in order to surmount the obstacle, but the stricture proving to be too narrow, there is not much success in expressing its contents, so that there is a strong but ineffectual peristalsis. Of course, there will be a delay in the emptying of the stomach, and even when the entire contrast meal has already left the stomach, there may still be remnants of the bismuth chyme in the dilated parts of the duodenum. These are the symptoms of duodenal stricture as described by Holzknicht and confirmed by all the other examiners.

I have lately observed a case of stricture of the duodenum and diagnosed the lesion on the strength of the  $x$ -ray plate. The patient, a man of about fifty years, complained of pains in his stomach, which began a few years ago, lasted two or three months, and returned after an interval of perfect health. During the past four months, he has again

suffered severe pains in the right side of his epigastric region, beginning one hour after eating and lasting several hours. No hunger pains. The chemical examination of the stomach contents showed that there was a considerable increase of the acid, and lavage of the fasting stomach revealed a muscular insufficiency. The  $x$ -ray examination showed that the stomach and the horizontal and descending part of the duodenum were dilated and permanently filled by the bismuth chyme. The bismuth shadow in the descending part of the duodenum narrowed and ended in a sharp wedge. Eight hours later there were still large remnants in the stomach and in the duodenum. Upon laparotomy we found just in the place corresponding to the stricture revealed by the  $x$ -rays a callosity in the duodenal wall. After gastro-enterostomy the patient was freed from his pains and definitely cured.

It is likely that stricture of the jejunum and ileum will be characterized by  $x$ -ray findings similar to those of the stomach and duodenum. These findings are the following:

1. An irregularity in the normal contours of the bismuth shadows due to the encroachment of the tumor on the lumen of the gut.
2. A delay in the passage of the chyme.
3. Changes in the normal peristaltic movements.
4. Dilatation of the afferent loop.

We must not expect to find in every case of stricture all these signs together. The longer the stricture persists and the narrower it is, the more distinct the symptoms will be in the radiograph. An early diagnosis is here just as impossible as in the radiography of the stomach. Small obstacles are surmounted by a normal muscular wall without dilatation of the loop or retention of its contents. Only if a certain degree of narrowing is reached will the changes be visible to the eye of the examiner. Similarly, a small growth will not cause an irregularity of the contours of the bismuth shadows. In any case, we will have to be careful in the interpretation of such defects of the shadow, much more than in the radiology of the stomach, as the intestines often reveal discontinuous shadows separated by larger or smaller gaps. Only if in several successive examinations we always find at the same place the same defect have we a right to become suspicious, and especially so if we find other symptoms of intestinal obstruction.

The first and, as far as I know, the only authentic case where the  $x$ -rays showed an irregularity in the contours of the small intestines due to a tumor was published by Kienböck.<sup>2</sup> He found six hours

<sup>1</sup> Holzknicht—Die Duodenalstenose durch Föhlung und Peristaltik roentgenologisch erkennbar. Deutsche Zeitschrift für Chirurgie. Band 105.

<sup>2</sup> Kienböck—Verhandlungen der Deutschen Roentgengesellschaft. 1911.

after the contrast meal in the lowest part of the ileum a narrowing of the bismuth shadow corresponding to a tumor that could be felt at that place. The afferent loops were tightly filled and the colon showed the usual shadows. When the operation was performed, a cancer of the ileocecal valve was found. But in the case published by Wendel,<sup>3</sup> the diagnosis does not seem to me justified by the x-ray finding of several intestinal loops separated from each other by short inter-walls, though the operation confirmed the diagnosis of several tuberculous strictures.

In the same way, retention of the contrast meal is alone no proof of a stricture. As a rule, a normal stomach and a normal small intestine will be free of bismuth shadow six hours after the contrast meal. But in cases of enteroptosis, Schwarz<sup>4</sup> found even after nine hours the lowest loops of the ileum still filled with bismuth chyme; in cases of so-called insufficiency of the ileocecal valve the emptying of the small intestine may also be delayed. This retention may be due, as Groedel<sup>5</sup> surmises, to the flowing back of cecal contents in the ileum. Bacher therefore had no right to diagnose a stricture of the ileum in a case where he found a retention after six hours. We also must not forget that a stenosis of the colon may in certain cases be the reason for a retention in the small intestine. An error like that can easily be avoided by using the contrast enema which will show the obstruction of the colon.

Neither the irregularity of the contours nor the retention of the chyme allow the diagnosis of a stricture if there is no other symptom that is characteristic of a stenosis, such as a change of the peristaltic movements like that we have already described for the duodenum, and called ineffective peristaltic contractions. Levy Dorn<sup>6</sup> and Stierlin<sup>7</sup> observed this kind of peristalsis in cases of stricture of the ileum, due to tuberculous callosities, and Novack<sup>8</sup> found it in a case of multiple strictures of the small intestine, also due to tuberculosis, and in another case where several fibrous bands, due to a previous peritonitis, had caused multiple strictures of the ileum and jejunum.

This ineffectual peristalsis is certainly a typical

sign of stricture of the intestine, but it is not an indispensable one. Indeed, just as in cases of stenosis of the stomach, here, too, the period of increased peristalsis in the beginning is followed by a period of diminished movements. The muscular fibers become fatigued and relax; the intestinal loop, unable to expel its contents, dilates. The first sign of the dilatation of the intestinal loop is that it appears on the radiograph to be more straight instead of coiled, it is broader than usual, and the indentations due to the folds of Kerkring are more distinct. Schwarz<sup>9</sup> found in a case of tuberculous stricture of the ileum, eight hours after the contrast meal, shadowy bands in the form of festoons stretching from the right to the left spine iliaca anterior superior and sinking in the middle to the symphysis. In a case of multiple tuberculous strictures, Stierlin<sup>10</sup> saw dilated loops in several places deeply indented, and after twenty-four hours the loops were still to be found. The same symptom is described by Hinz<sup>11</sup> in a case of cancer of the jejunum; below the shadow of the stomach and confluent with it, he found a big broad shadow that continued to the left as a shadow ten centimeters broad and as big as a child's arm and corresponding to the beginning of the jejunum.

If the stricture is narrow and persists long enough, this dilatation of the afferent loop increases. Decomposition develops in the retained intestinal contents so that the loop expands into an ampullaceous hollow space filled with chyme and gases. The x-ray photograph lets us discover one or more loops dilated like a ball; in the lower part of it we find a dark bismuth shadow and above a gas bubble. The limit between the gas and the bismuth is always a horizontal line whatever position we give to the abdomen, so that evidently the contents of the ampulla are liquid. Schwarz<sup>4</sup> saw in a case of cancer of the ileum, eight hours after the contrast meal, one big and two smaller balls filled half with liquid bismuth, half with gases; in another case he could observe the retention even after seventy-two hours; the stricture was this time due to metastasies of a cancer that caused a kink of the intestine. Czyhlarz and Selka<sup>12</sup> and Schmidt<sup>13</sup> observed, each in a case of tuberculous stricture, twenty-four hours after the contrast meal those same ampullas filled with gas and chyme. Re-

<sup>3</sup> Wendel—Multiple Stricturen des Dünndarms. Med. Gesellschaft, Magdeburg. 7. XI., 1912. Münchener Medizin. Wochenschrift. 1913/6.

<sup>4</sup> Schwarz—Die Erkennung der tieferen Dünndarmstenosen mittels des Roentgenverfahrens. Wiener Klinische Wochenschrift, 1911/40.

<sup>5</sup> Groedel—Die Insuffizienz der Valvula ileocecalis im Roentgenbild. Fortschritte auf dem Gebiet der Roentgenstrahlen. XX., 2.

<sup>6</sup> Levy Dorn—Verhandlungen der Deutschen Roentgen-Gesellschaft, 1911.

<sup>7</sup> Stierlin—Die Radiologie in der Diagnostik der Ileocecal-tuberculose und anderer Erkrankungen des Dickdarms. Münchener Med. Wochenschrift, 1911/23.

<sup>8</sup> Novack—Zur radiologischen Diagnose der Dünndarmverengerung. Wiener Klin. Wochenschrift, 1911/52.

<sup>9</sup> Zur Roentgendiagnose der Dün- und Dickarmstenosen. Verhandlungen der Deutschen Roentgen-Gesellschaft, 1912 und I. c.

<sup>10</sup> Stierlin—Zur Roentgendiagnostik der Dünndarmstenose und des Dünndarm ileus. Medizin. Klinik, 1913, S. 983.

<sup>11</sup> Ueber den primären Dünndarmkrebs. Archiv. für Klin. Chirurgie. Bd. 99.

<sup>12</sup> Czyhlarz and Selka—Beitrag zur radiologischen Diagnostik der Dün- und Dickarmstenosen. Wiener Klin. Wochenschrift, 1912/9.

<sup>13</sup> Schmidt—Bemerkungen über Dünndarmstenosen. Münchener Med. Wochenschrift, 1913/17.

cently I had had two analogous experiences, and as they are not as yet frequently observed, I shall describe them.

CASE I:—Mrs. A. was operated upon a year and a half ago by a gynecologist for a ruptured cyst of the ovary. Half a year ago she began to suffer from pains in her right side, attacks of vomiting and obstipation. While the patient lay in the clinic I could often observe stiffening of certain intestinal loops, and later on she even had stercoraceous vomiting. There was certainly an obstruction of the bowels, but where was it? That was the question put to the Roentgenologist. Seven hours—and in about the same way twenty-four hours—after the contrast meal, I found quite a few ampullaceous loops of the small intestine filled with liquid bismuth and above it a gas bubble, so that I diagnosed multiple strictures of the small intestine. As those ampullae were especially localized in the ileocecal region, although the other parts of the abdomen were not entirely free from them, the principal obstacles were supposed to be in the lowest loops of the ileum. But there was no indication of the nature of the stricture, and we had to content ourselves with the supposition, based on the antecedents, that adhesive processes caused the obstruction. This proved to be true; we found many very widespread coalescences between the intestinal loops, and especially one loop was for several centimeters fixed to the abdominal walls. The most affected loops were eliminated by entero-anastomosis and the patient returned home cured.

CASE II:—Mr. T. suffered from a tuberculosis of the upper lobe of the right lung, and for two years he complained of heavy pains in the abdomen. There was no vomiting, and the feces, which he affirmed to be regular, were free from occult hemorrhage. He had lost much in weight. The abdominal wall was so stiffened that no palpation was possible. There was no abdominal dullness nor ascites to be found. The *x*-ray examination, six and nine hours after the contrast meal, showed that the lowest loops of the small intestine were tightly filled with contrast chyme; they were not dilated and no abnormal peristalsis was to be seen. Besides, I discovered throughout the whole abdomen a great number of ampullaceous loops with liquid and gaseous contents. The ascending colon was both times empty, but at the second examination I found some bismuth shadows in the transverse colon. Twenty-four hours after the meal, the whole colon proved to be free, but in some of the dilated loops of the small intestine there were still some bismuth remnants. The diagnosis of multiple obstacles in the small intestine was thereby firmly established. The contrast enema discovered that, besides, there was an ulcerous colitis in the cecum, the ascending colon, and the first part of the transverse, and an insufficiency of the ileocecal valve, which was here most likely due to an ulcerous destruction of the valve itself. The probatory laparotomy proved my diagnosis to be right. There was a far advanced tuberculous peritonitis, a firm infiltration of the colon ascendens and transversum, and

numerous fibrous adhesions between the intestinal loops.

In some cases of intestinal stricture the afferent loop is dilated to such a degree that even without the contrast meal the *x*-ray examination shows the existence of large hollow spaces in the abdomen filled with gaseous and liquid contents. The contrast enema will then quickly demonstrate if those dilated ampullae belong to the colon or to the small intestine. That is an excellent method of studying ileus in such patients as cannot take the contrast meal. We spare trouble to our patient and save time besides. In a case of ileus due to adhesions, Stierlin<sup>7</sup> could thus show by the contrast enema that the small intestine was the seat of the intestinal obstruction.

By all this we see that gas bubbles in a dilated loop of the small intestine are a sure diagnostic sign of stricture. There is no possibility of confounding them with the air bubble in the fundus of the stomach, in the duodenal bulb, or in the colon, or the bubble in the recess caused by a penetrant ulcer of the stomach or the duodenum, or in some cases of subphrenic abscess. The other signs characteristic of the other affections will indicate the differentiation. There is but one observation published by Haudek<sup>14</sup> that might lead to a mistake. It was a sarcoma of the pancreas that had penetrated a loop of the small intestine and contained a cavity filled with intestinal contents and gas. The *x*-ray photograph showed an ampullaceous cavity with a big gas bubble and liquid beneath; but there was no disturbance of the motor function of the small intestine. The ampulla could therefore not correspond to a dilated intestinal loop.

The *x*-rays certainly afford an excellent method of detecting a stricture of the small intestine, but they seldom let us decide what the nature of the stricture is. If it were possible to see an intestinal stenosis just as distinctly as a stricture of the esophagus, we could by the indented or smooth edge of the shadowy band often discern whether the stricture was due to a malignant growth or an ulcerous narrowing. But we have seen that this is only in some cases possible, in strictures of the duodenum (Holtzknicht), the first part of the jejunum (Hinz), and the neighborhood of the ileocecal valve (Kienböck). In all the other cases the stricture itself was not to be seen on the *x*-ray screen or plate, and we had to base the diagnosis upon the effects produced by the stricture. And we find the same results, no matter what the nature of the stricture is, be it a cancer or a callous scar that

<sup>14</sup> Haudek—Die Roentgendiagnose eines abnormen Hohlraumes im Abdomen. Wiener Klinische Woch., 1910/1.



narrows the intestinal lumen, or be it adhesions or a tumor that compress the loop from the outside. The various pictures we get of the intestinal stricture do not correspond to a specific kind of stenosis, but only to the degree and the duration of the stricture.

X-ray examinations are equally unsatisfactory as to the seat of the stricture; here, too, the duodenum, the beginning of the jejunum, and the lowest loop of the ileum form an exception, because of the neighborhood of the stomach and the colon, respectively, which indicate the site of the lesion. But the strictures of the middle loops cannot be localized on the x-ray plate. It is impossible to judge by the appearances at what short distance the stricture is from the duodeno-jejunal plica, and at different examinations the strictured loop may even have different positions. That is the reason why David<sup>15</sup> invented his probe, analogous to the duodenal probe; it is gradually advanced until it reaches the stricture and then a contrast liquid is instilled. By that method we can easily find out the distance of any stricture from the range of the teeth. But to my thinking, we are not made much wiser by it. A stricture of the small intestine has to be operated upon. The place where the strictured loop is to be found often reveals itself to the surgeon by the fact that a tumor is to be felt or stiffened loops are to be seen. And if the clinical observations do not show us the seat of the strictured loop, we learn nothing by knowing the distance of the stenosis from the teeth; we must open the abdomen and the dilated loops will then show us where to find the stricture.

But the method may prove helpful for making out the nature of the stenosis, and we will certainly often be able to discriminate between intestinal obstructions due to adhesions and those due to ulcerous affections. But I doubt if we may distinguish between a cancer and a circular tuberculous ulcer. For this, however, there is no need, since they alike require surgical attack.

*Summary:* The x-rays are an excellent aid in the diagnosis of strictures of the small intestine. The characteristic signs of a stenosis are:

1. Irregularities of the contours of the bismuth shadows.
2. Retention in the small intestine far longer than the normal time.
3. Strong but ineffectual peristaltic contractions.
4. Dilatation of the afferent loops; in the first period the loops are broader and straighter than usual; later on they are transformed into ampulla-

ceous hollow spaces filled with liquid and gaseous contents. Sometimes these ampullae are to be seen without a contrast meal.

Not all of those signs are needed to establish diagnosis. Irregularity of the contours or retention alone do not allow the diagnosis of a stricture. Lack of peristalsis does not speak against a stenosis.

If the stricture belongs to the duodenum, the beginning of the jejunum, or the lowest loops of the ileum, the x-rays enable us to localize the seat of the narrowed parts and sometimes even to recognize the nature of the stenosis.

## STRAIGHT DIRECT LARYNGOSCOPY, BRONCHOSCOPY AND ESOPHAGOSCOPY.

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BALTIMORE, MD.

(Continued from July Number.)

### UPPER TRACHEO-BRONCHOSCOPY.

That the upper operation is more difficult than the lower is evident from the fact that the larynx has to be passed. For this reason, one, to become an expert bronchoscopist, must have a good working knowledge of direct laryngoscopy. In an emergency one who is not particularly skilled in direct laryngoscopy may succeed in getting a tube into the trachea, but his movements will be uncertain and fraught with danger to the patient. If, during the attempted examination, strangers are present, the awkward and hesitating movements of the operator will be noticed to his discredit and embarrassment. In no branch of medicine is lack of experience or ignorance so quickly noticed. Unlike direct laryngoscopy tracheo-bronchoscopy is difficult to learn to do well. While any laryngologist can learn direct laryngoscopy in a few lessons, passing a long tube into the trachea in the proper way is a difficult procedure. There are many problems to overcome before one can call himself a finished operator. Some few men never succeed in passing the bronchoscope because they are not fitted by temperament to do such work. On two different occasions the writer heard expert laryngologists say they could not do bronchoscopy because they did not have the patience. It is undoubtedly true that some men are born with a certain manual dexterity which stands them in good stead in passing tubes. To all laryngologists who would do tracheo-bron-

<sup>15</sup> David—Zur Roentgendurchleuchtung des Dünndarms. Verein der Aerzte im Halle, 21 May, 1913. Münch. Med. Woch., 1913/32.

choscopy, the writer would give the advice to practice direct laryngoscopy faithfully before attempting to pass the bronchoscope. Improved methods have made bronchoscopy easier, but one had better undertake it with full knowledge of its difficulties. The keynote of successful tracheo-bronchoscopy is gentleness; rough handling of the tubes will not only not succeed, but may result seriously to the patient. As with direct laryngoscopy, there are different methods of doing bronchoscopy. The method used in Europe and extensively in this country is to pass the bronchoscope with the head extended. In Brunings' book one sees the patient on the table with head extended and resting on the lowered leaf. In this country the "Boyce position" seems to be the popular one with the patient supine. In the sitting position the head is extended as in the "Boyce position."

#### TRACHEO-BRONCHOSCOPY IN THE SITTING POSITION.

As usually practiced in the sitting position the patient is seated on a low stool with the head extended and supported by a nurse. The degree of extension depends upon the size of the instrument used and upon whether the tube is passed between the incisor or the bicuspid teeth, the former requiring more extension than the latter. The pharynx is deadened with a four per cent. cocaine solution; after waiting a few minutes, the separable speculum is passed, the epiglottis hooked forward, and ten per cent. cocaine solution applied to the larynx. If the vocal cords are sensitive, more cocaine will have to be used. In a few minutes the larynx should be sufficiently anesthetized to pass the bronchoscope. Most operators cocaineize the trachea through the laryngoscope with a straight applicator. The trachea does not need much cocaine. With the head in the proper position, the separable speculum is again passed, the larynx is exposed, and the bronchoscope is pushed down through the speculum until the vocal cords are reached. The eye is now transferred to the smaller tube, and during inspiration it is gently pushed between the cords into the trachea. The long tube is now intrusted to an assistant and the separable speculum removed by sliding the short blade out. The operator now takes the bronchoscope and passes it down, examining the trachea. When the bifurcation is reached, the tube naturally passes into the right bronchus, which is practically a continuation of the trachea. If any trouble is experienced in getting in to the right bronchus, the patient's head is turned slightly to the left when the bronchoscope usually slips into the bronchus without trouble. About an inch from the bifurcation, on the outer wall of the bronchus,

is the opening of the secondary upper lobe bronchus; to be seen the end of the tube must be pushed to the right and the outer wall of the bronchus carefully examined. It is not possible to see far into the opening with the ordinary tube; by using an instrument with prisms Killian was able to see some distance into the bronchus. As foreign bodies practically never lodge here, it is not of much practical importance. To find this opening is perhaps the most difficult part of the examination to the beginner; indeed, in some cases it is not easy for the expert, since, as stated above, its origin is by no means constant. The writer has adopted the plan of locating this branch first and, with this end in view, he pushes the bronchoscope against the outer wall as soon as the bifurcation is passed; by examining the wall carefully as the tube is passed down, it is practically impossible to miss it. Just a short distance down from this opening is seen the secondary bronchus leading to the middle lobe; it is situated on the anterior wall of the bronchus and is perhaps a little smaller than the one above. It is not possible to explore this tube very far, though it is more favorable than the one above because it does not come off at the same acute angle. At this stage of the examination the terminal bronchi leading to the lower lobe can be seen even without pushing the bronchoscope further down; to recognize clearly the tertiary bronchi, the tube must be advanced a little further. The terminal bronchi are divided into anterior and posterior branches, the latter being the more numerous; they are individually much smaller than the bronchi going to the upper and middle lobes. Looking into a terminal bronchus with a good light, one sees the partitions between the secondary and tertiary branches, resembling the bifurcation in miniature, with a whitish appearance in striking contrast to the membranous portion below. The main bronchus and the terminal bronchi are the most important tubes from the foreign body standpoint; objects of any size which pass the trachea are certain to lodge in the main bronchus, while small objects, such as steel pins, etc., often pass into the terminal branches and of course are more difficult of removal because harder to get at. In some cases very small tubes must be used with correspondingly small instruments which makes successful extraction extremely difficult and in a few cases impossible. Since the left bronchus comes off at a more acute angle than the right, the bronchoscope must be turned to the left by throwing the head sharply to the right; as a rule the tube then enters the bronchus easily. The examination is then carried out as on the right side by pushing the tube down alongside the outer wall

of the bronchus to locate the secondary bronchus going to the upper lobe. Since there are only two lobes on the left, the opening of the secondary bronchus is always situated lower down than on the right side, and to be seen clearly the head must be carried still further to the right. It can be examined about as well as the opening of the opposite side. The distance between this opening and the terminal bronchi is short and the latter present the same general appearance as on the right side. Because of the difference of the angles of deviation of the two bronchi, foreign bodies are more apt to lodge in the right than the left bronchus; some very curious cases of foreign bodies in the left main and terminal bronchi, however, have been reported. All the foreign bodies seen by the writer have been in the right bronchus. In looking for foreign bodies, not possible of location by the *x*-ray, one should not be satisfied until every portion of the bronchial tree has been examined. In using Jackson's in-

necessarily be completed as quickly as possible. It is a peculiarity common to every kind of direct examination that its difficulties vary to a great extent with each case, and this is more especially the case in direct tracheo-bronchoscopy. Whereas, on the one hand, a brief diagnostic glance in the case of a patient in the sitting position, who is particularly tolerant and easy of examination, presents one of the easiest problems; on the other hand, the treatment of a case of a chronic foreign body may make such extensive and varied demands on the operator as perhaps occur in no other surgical operation. In such a case it is necessary to be cautious and to keep within permissible limits while proceeding without hesitation. It is a question of combining the application of force with manipulative skill of an unusual kind, and of controlling the behavior of the patient and of the technical apparatus with equal certainty. If, besides this, the haste required and the danger which may result from a moment's

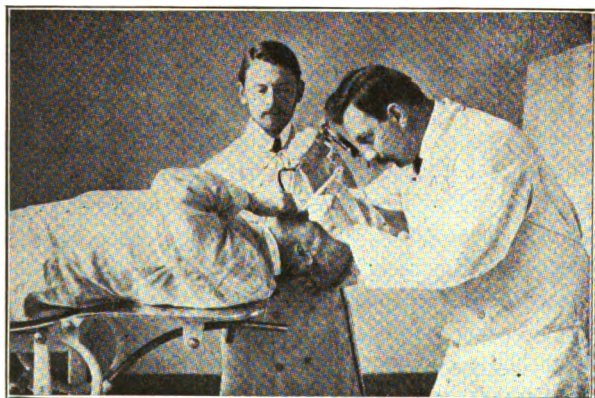


Fig. 1. Introduction: Stages I. and II. Brunings.

struments the object of the double battery is seen in the introduction of the bronchoscope where one can light the laryngoscope and the bronchoscope at the same time. As the writer does not use the separable speculum for passing the bronchoscope, he no longer needs the double battery, but for the beginner it is indispensable. As stated above, if one prefers Brunings' instruments, he must have a more powerful source of light than a battery of dry cells.

*Brunings' method.* This method will be given in Brunings' own words. He says: "It has already been indicated that far greater difficulties are presented by the upper method as compared with lower tracheo-bronchoscopy. The reason of this is, in the first place, that the introduction is more complicated and the larynx has to be passed; secondly, that the tube is not only much less mobile, but at the same time longer; and, thirdly, that the patient is inevitably inconvenienced, and the examination must



Fig. 2. Introduction: Stages III. and IV. Brunings.

delay are considered, my reason for laying stress again on the value of careful preparation will be understood. Upper bronchoscopy should be preceded by a detailed preparation carried through with pedantic thoroughness, in order that it may proceed swiftly, calmly, and without interruption. The tube should be introduced immediately after the use of cocaine, and, though hurry must be avoided, the duration of endoscopy must be reduced to a minimum, and all unnecessary repetition omitted. The necessary preparations include not only the complete mastery of the instruments, but also some practice in direct laryngoscopy and lower bronchoscopy. The practice of the upper method consists simply in combining these two, and even a beginner, if he has mastered them, may attempt the procedure with confidence. Apart from abnormal anatomical conditions, the upper method of bronchoscopy is always applicable; and fortunately it is possible, by means of those tests which were men-



tioned for direct laryngoscopy, to determine to some extent beforehand the very variable degree of practicability, so that an easy case may be selected for the first experiment. The indications for direct tracheoscopy vary within wide limits. It scarcely needs to be pointed out that children are not suitable subjects for a beginner. I must also state that examination is by no means always facilitated by general anesthesia, if only for the reason that upper bronchoscopy, like all direct methods of examination, succeeds much easier when the patient is sitting than when he is lying down. Upper tracheo-bronchoscopy may be regarded as a combination of the lower method and direct laryngoscopy. Both are connected with the passage of the larynx, and it is only in this part of the examination that there are any considerable differences of method. As it presents at the same time the most difficulties, it seems to me advisable to discuss here the different methods of introduction separately, except in the

"Stage III. Passing the tube into the trachea."

Introduction when the patient is sitting. In this case the typical technic of autoscopy with all its details, must be applied, the short autoscopy spatula being replaced by the longer spatula-tube, the size of which will be determined according to directions already given. Usually no great difficulties of orientation arise in this respect with adults; but when the longer tube is being used, and the hand placed as mentioned on page 101, great care must be used to avoid lateral deviations and going too deep, as it is easy to pass across the epiglottis into the hypopharynx. It is only necessary to present the entire glottis, as far as the neighborhood of the anterior commissure, when a view of the trachea from the larynx is desired. Otherwise it is enough to present the last third of the vocal cords, as complete autoscopy requires a much stronger displacing pressure than is necessary for passing the tube. The sloping end of the tube presses the larynx

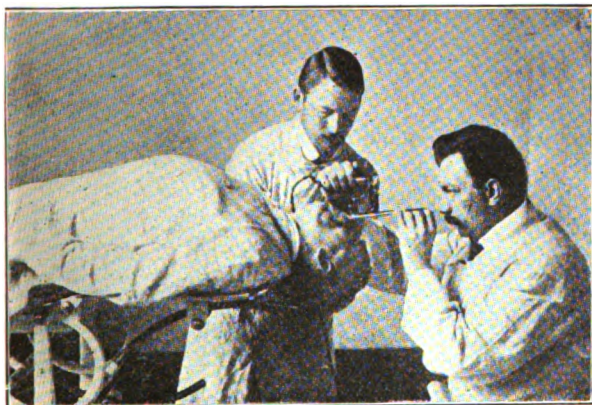


Fig. 3. Introduction of the inner tube. Brunings.

case of children, as they require special consideration. It has been stated before that with the long, narrow tubes which were used formerly, the passage of the larynx was only effected by means of special instruments, which might, as pilot bougies, serve for blind intubation, or, like Killian's divided spatula, render the autoscopic passage of the larynx possible. When my double tube is used these methods are unnecessary. The spatula tube can always be introduced without further expedients, and only those differences which arise from the different positions of the patient have to be considered. All tracheo-bronchoscopic examinations, if scientifically carried out, begin with direct laryngoscopy, and may be divided into three stages, which the beginner is recommended to follow pedantically.

"Stage I. Presentation of the lingual surface of the epiglottis.

"Stage II. Passage beyond the epiglottis; autoscopic displacement.

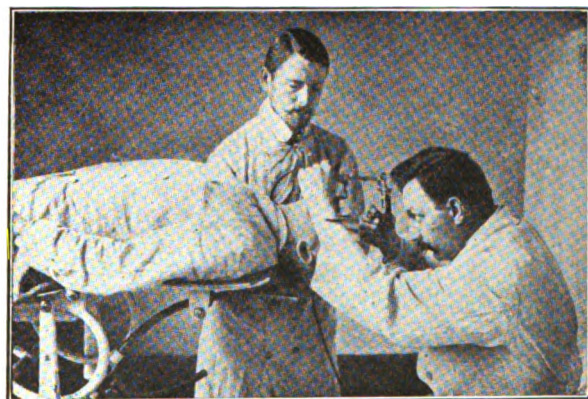


Fig. 4. Operation with the forceps. Brunings.

backwards, in accordance with the counter-pressure procedure, so that when introduction is effected there is only a comparatively slight pressure of displacement. Patients who are difficult to examine may be afforded considerable relief by the employment of the counter-pressure method. Of course, the counter-pressor cannot be employed; but the action of the instrument may, to some extent, be obtained by manual displacement of the larynx. Unfortunately, the left hand will not be able to be used to protect the lips and teeth, and a particularly careful manipulation will consequently be necessary. The passage of the larynx may be further facilitated by the following expedients: The subject should be asked to breathe calmly, slowly and deeply, and the attitude thus assumed can be taken advantage of for passing the tube. It is not of much consequence whether complete abduction of the vocal cords is obtained, because the sloping end of the tube, if exactly in the middle line, can

easily part them without causing much inconvenience. It is only when anesthesia is incomplete that it may be necessary to insert the wedge-shaped end of the tube in a sagittal direction, in order to separate the apposed vocal cords. When there is much resistance, the passage of the tube—after it has been well greased and warmed—may be facilitated by not pushing it with the right hand, but manipulating it with short leverage movements by means of the left index finger. All friction against the teeth and the left hand is thus avoided, and the tube advances gradually without jerks."

*The writer's method.* The writer has worked out a simple method which is somewhat similar to Brunings' except that only one tube is used and the position of the head is different. Since the introduction of the straight method of direct laryngoscopy nearly five years ago, the writer has used

deadens the trachea sufficiently. The laryngoscope is now withdrawn and the bronchoscope rubbed with sterile vaseline. The head is held as straight as possible; in many patients it is almost perfectly straight, while in others it is slightly extended. Compared with all other methods, the head may be described as straight in every case. The patient opens his mouth, and with the eye looking through the long tube, it is passed between the left or right bicuspid teeth. It is perhaps better to use the right side of the mouth, since it is easier to enter the left bronchus from that side and there is no difficulty in getting in to the right bronchus. The bronchoscope is passed with the right hand, while the left index and middle fingers rest on the lower teeth to act as a pilot and to steady the tube in its descent. The tube slips down easily, pushing the tongue out of the way, and the epiglottis quickly

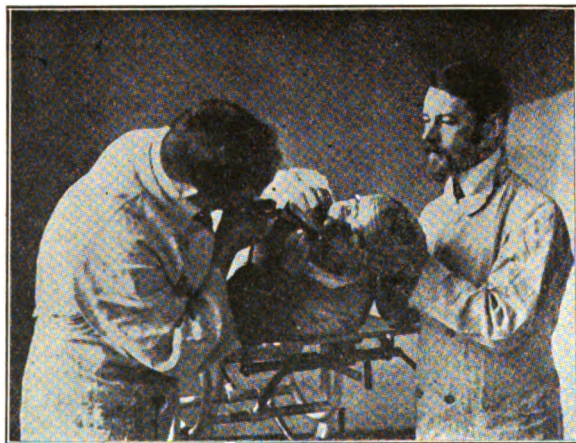


Fig. 5. Introduction in the lateral position. Brunings.

a method of tracheo-bronchoscopy which seems much simpler than other methods. The basis of the method is the straight position of the head as used in direct laryngoscopy and upper esophagoscopy which have succeeded so admirably in the hands of all who have employed them. The patient is seated on a low chair with a comfortable back; the pharynx is anesthetized with a twenty per cent. solution of alypin applied with a curved applicator. After waiting a few minutes the small laryngoscope is passed until the epiglottis comes into view. The larynx is now brushed over with alypin applied on a straight applicator through the laryngoscope. As in direct laryngoscopy the tube is passed between the left bicuspid teeth with the head straight. The epiglottis is now hooked forward and the larynx inspected. If the vocal cords are still sensitive, more alypin is applied to them and a long applicator loaded with the same drug is pushed between the cords and down to the bifurcation, which usually



Fig. 6. Introduction in the ventral position. Brunings.

comes into view. This movement, which is simply pushing the tube straight down, may be called the first movement. The second movement consists in pushing the end of the tube backward against the wall of the pharynx and then reversing the movement to pull the epiglottis forward. When this is accomplished, the larynx comes into view and the third movement is soon finished by pushing the tube between the cords by a gentle rotary motion. It is better to turn the instrument so that the long end will insinuate itself between the cords first so that the tube will follow without difficulty. In passing the tube no account is taken of whether the cords are separated or not. The method has been described as consisting of three movements; as a matter of fact, the tube enters the trachea so quickly that the three movements seem to be only one. It takes a few seconds to get the tube into the trachea. Since the head is straight, there is no obstruction to the entrance of the bronchoscope.



After trying all methods, the writer believes this to be the simplest and quickest way of passing the bronchoscope. He is convinced that it will work in all patients and that larger tubes than nine millimeters will pass into the trachea with ease because, as emphasized above, the muscles are relaxed. If a patient happens to be particularly nervous, the writer gives large doses of bromide of soda for a day beforehand or a dose of morphine and hyoscine hypodermatically a half hour before the examination. The cases in which such measures have to be taken are rare, but they are of the greatest help occasionally. When the bifurcation is reached, if the tube has been passed from

ments are best because they are so easily handled; they are just the right length for easy and quick manipulation. In looking for a foreign body in an adult under local anaesthesia, it is perhaps better to spray a ten per cent. alypin solution into the trachea and bronchi for fear of disturbing the object by accidentally touching it with the applicator. The spray tube is introduced through the bronchoscope. With the head straight one finds that the patient is usually perfectly comfortable and that one can take his time in examining the trachea and bronchi. The writer has often during a demonstration of the different parts of the respiratory tract kept the tube in as long as 45 minutes with little discomfort to the patient.



Fig. 7. Passing the nine millimetre bronchoscope without the aid of the separable speculum. The bronchoscope has passed between the vocal cords and is in the trachea. This patient had very prominent teeth which accounts for the fact that the head is somewhat extended. The method is easier when the head is almost straight.

the right side of the mouth, no difficulty will be experienced in getting into the left bronchus. At no time during the examination is the head in much extension and the "straight method of bronchoscopy" is a reality. The writer long ago gave up separable specula, pilots, etc., for passing bronchoscopes because they are needless and disagreeable to the patient. It is perhaps a little more difficult for the beginner to see the landmarks through a small tube, but he soon masters this difficulty and the work becomes easy. The writer often passes the five millimeter tube by this method for practice in training the eye to see through a small tube. The writer has given his method the name of "straight bronchoscopy," because the head is often straight until the bronchoscope passes into the trachea. For this method the Jackson instru-

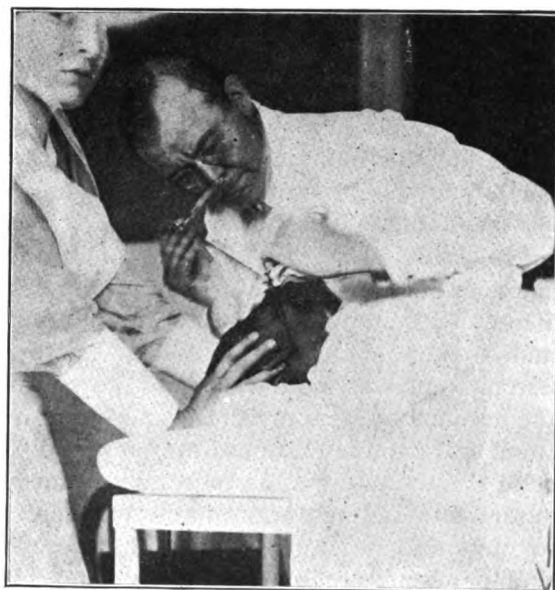


Fig. 8. Passing the bronchoscope through the large separable speculum with the patient's head on the table. Ether anaesthesia. The bronchoscope is passed preferably between the right bicuspid teeth because it is easier to enter the left bronchus from the right side.

#### BRONCHOSCOPY IN THE SUPINE POSITION.

*The Boyce position.* Jackson uses this position for passing the bronchoscope with the patient on the table. As described in the chapter on direct laryngoscopy, the Boyce position consists in pulling the head and shoulders over the end of the table while a trained assistant sits to the right of the operator and holds the head. The operator sitting on a low stool, passes the separable speculum with the left hand and hooks the epiglottis forward, exposing the larynx. The bronchoscope is then passed through the laryngoscope and between the cords into the trachea. The separable speculum is removed and the examination proceeded with. The same objections which were enumerated under direct laryngoscopy hold true against the "Boyce position" in tracheo-bronchoscopy. The writer con-

tends that the cramped position of the operator and the unnatural position of the patient are not conducive to the best work. He therefore proposes to suggest another position which he believes will be easier for beginners. Jackson has become wonderfully expert with this position, but for other operators it is difficult. This position is rarely used unless the patient is to be given a general anesthetic.

*Brunings' method.* "Normally this is done with the patient lying on his back while an assistant supports his hanging head in such a way as entirely to relax the muscles of the neck. In this, just as in autoscapy, too much strain at the outset must absolutely be avoided, and the surgeon should perform the first stage in a more or less upright position. The position of the electroscope follows from the general rule which requires the lamp to be directed sagittally to the patient. The left hand should then resume the position in which it protects the lips and teeth and insures the medial direction of the tube. During stage II. of the autoscopic displacement, the patient's head must necessarily be lower, so that the surgeon can resume a sitting position. Here again the protection of lips and teeth must be remembered, and no advance should be made in the manner indicated until the autoscopic presentation is obtained. Introduction in the dorsal position is rendered difficult, not only because topographical relations are reversed, but because the electroscope has to be manipulated in an unaccustomed manner, and the direction of autoscopic pressure is inconvenient. It is therefore advisable, when there is an opportunity to obtain some preliminary practice in autoscapy on sitting patients, the introduction being made by the surgeon standing behind the patient's back. The phonation (sound of breathing) must be attended to, and the three stages carefully observed. When introduction in the dorsal position presents insuperable obstacles, it is usually possible to succeed in the following manner: Put the patient over on his left side, having the head supported, and then introduce exactly as in the sitting position. When the tube is in the trachea, the patient should be carefully moved on to his back, because the lateral position becomes tiring for the surgeon. I have found that this introduction in the lateral position generally succeeds fairly easily even with inexperienced operators. The lateral position appears to offer no advantages for the further pursuit of the examination; in esophagoscopy the opposite is the case, because the unaccustomed relative positions make orientation even more difficult. No doubt excep-

tions must occasionally be made—for instance, when there are objections to having the head hanging over the end of the table (in the case of elderly people), or if it is desired to facilitate the removal of bronchiectatic secretion by raising the diseased side of the lungs."

The writer never uses the supine position without general anesthesia, since he has always succeeded in examining patients in the sitting position under local anesthesia. The method to be described is practicable, however, for more than once the larynx has been examined in the supine position with head straight under local anesthesia and exactly the same position is used in passing the bronchoscope. For bronchoscopy under general anesthesia, the writer is convinced that the method is the simplest and quickest of all methods. There are two ways of passing the tube, both of which will be described. The table used is one of average height with or without a leaf that can be lowered.

*Bronchoscopy with the separable speculum.* The patient lies on two cushions which are just thick enough to allow the head to fall to the plane of the table when the small cushion is removed. This must be carefully regulated before the anaesthetic is administered so that no time will be lost after the operation begins. The writer has two cushions which are suitable for all patients. With the patient etherized or not, as the case may be, the operator, standing to the left of the table, passes the large or small separable speculum according as a large or small bronchoscope is to be used, between the left bicuspid teeth, hooks the epiglottis upward and exposes the larynx. The bronchoscope is then passed through the laryngoscope and the eye is transferred to the smaller tube. When the vocal cords come into view, the bronchoscope with a gentle twisting motion is slipped between them into the trachea. The long tube is now steadied by an assistant while the operator removes the separable speculum and directs that the cushion under the head be removed so that it can be lowered to the plane of the table. The operator now takes his seat at the head of the table on an ordinary stool and takes charge of the bronchoscope. It will generally be found that the head is too low and a small pillow will have to be placed under it. In this method it is not necessary to pay any attention to the shoulders, which is so important in the "Boyce position." Having adjusted the head at the proper height, the tube is pushed down easily. It will be observed that the head is only slightly extended. When the bifurcation is reached, the operator turns the head with the left hand while the right guides



the tube into the bronchus to be explored. Since the patient is asleep, there is no difficulty in changing the tube to the right side of the mouth if necessary, but usually it will be found that one can enter the two bronchi with equal ease from the left side. The writer has been surprised more than once at the slight movement of the head required to pass the tube into the bronchi. There is no necessity to move the head antero-posteriorly, since the pillow of proper thickness attends to that. While the preliminary movements may sound complicated, it requires only a few seconds to get the bronchoscope into the trachea and to push it further down. The many advantages, as seen by the writer, will



Fig. 9. Upper bronchoscopy. Head on the table. No trained assistant necessary. Movements of head controlled by operator's left hand. The position of the operator is perfectly comfortable. This position is suitable for adults and children.

be pointed out under the other method of bronchoscopy.

*Bronchoscopy without the separable speculum.* The position of the patient is the same as for the first operation except that the head is slightly extended. The operator sits at the head of the table and passes the bronchoscope between the right or left bicuspid teeth; the index and middle fingers of the left hand are placed between the teeth to act as a pilot. The tube is passed down until the epiglottis comes into view when the long point is depressed against the wall of the pharynx and pushed slightly downward and then upward to hook the epiglottis out of the way. The larynx is now exposed and the tube is carried between the vocal cords by the same twisting or rotary motion described above. Under general anesthesia one does not have to exercise the same care in passing

the tube between the cords as under local anesthesia, though gentleness in manipulating instruments is always necessary. This method is probably more quickly executed than the first method, but it is more difficult for the beginner, because the small tube is passed upside down so to speak. After the tube passes the vocal cords, the position of the head is regulated as above and the examination is proceeded with. The writer has found these methods perfectly satisfactory under general anesthesia and believes they possess many advantages over other methods. To begin with, the work is simplified in that fewer assistants are needed; the only assistants absolutely necessary are an anes-



Fig. 10. Low tracheoscopy. Local anesthesia.

thetist who, after the patient is asleep and the tube introduced, stands to one side and gives ether as may be needed, and a nurse to load the instruments. No assistant is needed to hold the head because throughout the procedure the head is on the table. Again the operator sits on a high stool and manipulates the instrument from a comfortable position which increases the pleasure as well as the rapidity of the work. Thirdly, the instrument is passed with the head in a more natural position than in other methods and there is no strain on the arm as in the "Boyce position"; and, fourthly, it has seemed to the writer that less extension of the head is necessary than in other methods, since it is exactly similar to bronchoscopy under local anesthesia. In older children the same methods are used; in younger children, no anesthesia is used and the head must be extended slightly more to pass the bronchoscope by these methods. Jackson uses the

"Boyce position' in children as in adults. Brunings advises a special set of instruments for children and makes some statements which expert bronchoscopists in this country will not endorse. His views on endoscopy in children are so at variance with those held in this country that the writer thinks it will not be amiss to copy his chapter on this important subject. He says: "When I mentioned the use of direct laryngoscopy and tracheo-bronchoscopy in the case of small children, I did not lay any special stress on it, as I wished to detail the normal procedure as clearly and comprehensively as possible. On account of the unusual difficulties encountered in the direct examination of children, it is not only necessary to employ numerous variations of methods, but additional instruments are also very useful in certain cases. If, then, the undoubted importance that the method must assume in the hands of children's specialists is considered, no further excuse for the inclusion of this chapter is necessary. The difficulties in examining children lie, in the first place, in the relative smallness of the parts to which the endoscopic apparatus must be adapted. The diameter of the bronchoscope tube is reduced to 7.6 millimeters, and approaches the limit at which orientation or the manipulation of instruments under the guidance of the eye is possible. In addition to this the restlessness of children, their tendency to spasm and salivation, the forcible respiratory movements of the trachea and bronchi, and, above all, the increased danger of collapse owing to the use of cocaine or a general anesthetic, must be taken into account. The endoscopic treatment of children yields, however, such gratifying results that it surpasses in importance the endoscopy of adults. In this connection I need only mention the case of foreign bodies, of which far more than half occur in childhood. According to the statistics of Gottstein, which I have already referred to frequently, the series of 111 cases of foreign bodies which he treated bronchoscopically show the following age distribution:

Age (years)	0-1	1-2	2-6	6-12	12-18	18-63
Foreign bod...	6	11	35	17	6	36

Taking the percentages it is seen that the period from birth to six years embraces forty-seven per cent. of all cases; the period from birth to twelve years old, sixty-nine per cent.; whilst the entire period from twelve to sixty-three is responsible for thirty-eight per cent. The instruments contained in any normal set usually suffice for small children, but it is obvious that an instrument which is strong and big enough for the examination of grown men is not exactly the most suitable for small children.

I will therefore describe some special instruments and their degree of importance as well as the special advantages attaching to their use. For general use, the composition of a set suitable to children's requirements will be given, and the children's specialist can confine himself to these. In the mechanical construction of my broncho-electroscope, the application of force which the autoscopic displacement in adults entails must be taken into account. The special handle which I constructed with this object is neither necessary nor, in many cases, convenient for the examination of children. For lower tracheoscopy, which is so much more frequent in children, the handle is inconvenient, owing to its length and weight being relatively so much greater than that of the small tracheal funnel. The mechanism, also, whereby the lamp can be pushed to one side, is not of much use in children, as their delicate air passages do not permit of the lateral pressure bound up with this maneuver. I would advise, if the equipment is very complete, that the universal electroscope should be used for children. The lamp and projection apparatus are the same as in my broncho-electroscope, but the light handle affords more easy manipulation in those cases where the employment of force is not necessary, and where the tube must lie close to the surface of the body (tracheal fistula, etc.). The mechanism of the mirror holders is also very convenient in examining children. By pressure of the thumb it is clipped in position above the upper end of the tube, and when the pressure is removed it flies back into its original position. I have often used the instrument to great advantage in lower tracheo-bronchoscopy. A special spatula is particularly desirable in direct laryngoscopy of children, and I have devised one to meet the case. The instrument is grooved and has a somewhat broad fish-tail end, the upper half is bent round to form a kind of box, which is, however, open on the right side, so as to facilitate the introduction of instruments and their manipulation at an angle. I must further recommend the use of the five normal bronchoscopic tubes through a tube, No. 1.5, of 7.75 millimeters diameter, which is more suited to children's requirements, and is midway between No. 1 (7 millimeters), and No. 2 (8.5 millimeters). It is made of tempered steel. Exact observation in the neighborhood of a tracheotomy wound (difficult decanulation) makes necessary the use of a special 'tracheal funnel,' such as I have figured in Fig. 86. The sloping end serves for the earlier use with a mandrin, and allows a complete inspection of the whole length of the wound. The tracheal funnel is manufactured

in three sizes—5, 6.5 and 8 millimeters in diameter. The longest size does very well for direct laryngoscopy of infants. The extreme narrowness of the tubes for children makes operating "under complete ocular control" largely an illusion. I have, however, had a forceps of 17 centimeters long constructed, which can be held and manipulated very delicately owing to its shortness and absence of any lengthening mechanism. Its small end pieces are interchangeable. The instrument is very useful for the extraction of difficult foreign bodies, and I have also used it for the removal of diphtheretic membrane from the bronchi. It is further advisa-



Fig. 11. Low tracheoscopy. Patient on the table. Local anesthesia. This patient has stenosis of the trachea.

ble to have an extra thin pump-tube and wool carrier.

**Anesthesia.** Wherever painting under guidance of a mirror is possible in older children, the method described for adults should be adopted, but the cocaine solution should never be stronger than ten per cent. A short, bent steel wool carrier or a nasal probe is more convenient than the painting syringe. For small children reliance must be placed on cocainization by palpation, as a spray is out of the question. It usually suffices to bring the epiglottis into view with a tongue spatula—though this is often not possible—and to paint its laryngeal surface with a curved wool carrier more or less under visual control. As a rule, however, the finger must be passed into the larynx, and, guided by that, the painting done as well as possible. In infants anesthesia must be dispensed with. In inducing anesthesia, the great tendency that small chil-

dren have to subglottic swelling should always be remembered, and the painting should therefore be proceeded with very cautiously. If any laryngeal dyspnea is present, any painting is contraindicated. In laryngeal affections of unknown nature, it is advisable to make the examination without anesthesia—as often as can be done—or to use a general anesthetic. General anesthesia should be used for prolonged or especially difficult examinations, and should be limited to those conditions in which absolute stillness is essential. It is obvious that general anesthesia is more often necessary in bigger children, as they cannot be expected to keep still spontaneously, and any compulsion is merely a prelude to other difficulties. However, at this age indirect laryngoscopy is often practicable.

**Position.** The sitting or upright position is a great help in examining children. The child should be held almost in the position usual for adenoid operations, but need not be so completely wrapped up in a blanket. The head must, however, be able to be moved passively, so that a second assistant is almost indispensable. For prolonged anesthesia the lying position is almost indispensable, but a short anesthetic may be administered without danger while the child is sitting up. The lying position further facilitates the fixation necessary for accurate examinations or operations under local anesthesia, and diminishes disturbances caused by the profuse salivation. A somewhat higher table is necessary for examinations in this position, and the top should be covered with a light cloth to aid in keeping the patient firm.

**Examination.** The method which has already been described will serve for direct laryngoscopy both in the sitting and lying positions, but it must be borne in mind that unless a general anesthetic is used some degree of compulsion will be necessary in making the examination. Not only is no help obtainable from the patient, such as the assumption of a suitable position, light breathing, holding the tongue, phonation, etc., but every device has to be used to overcome active opposition. The child jerks its head, bites the spatula, and moves the base of the tongue in all directions, so that a typical observation of the third movement can never be relied upon. In addition to this must be considered the hopeless tendency that the pharynx, pars supraglottica laryngis and the glottis show towards sphincter-like closure, and that even in the momentary intervals of relaxation the opening is usually hidden by a foaming mass of pent-up secretion; whilst a recollection of the delicacy and the diminutive size of the parts, and the ever-present

necessity for the utmost caution, often discounted, however, by sudden movements, will give some idea of the difficulties involved in the examination of children. Fortunately, however, there are gleams of sunshine even in this difficult task. Children are as a rule very suitable for autoscopes, not only on account of the plasticity of the soft parts and the easy mobility of the vertebral column, but also, as Wild pointed out, on account of the transition from the pars laryngea pharyngis to the axis of the bronchi being straighter than in the adult. A relatively wider tube spatula can therefore be used, or better still, my grooved children's spatula with open-sided box. Orientation is facilitated with this latter instrument, so that full electrosopic illumination is obtained, and the first and the second movements can be readily carried out and a large field of vision secured. The spatula should not be held too obliquely, and the difficulty of keeping the midline on account of the mobility of the tongue should be minimized by using the handle previously described. A further maneuver consists in waiting, and using the brief moment of inspiration for the introduction, and in allowing an assistant to pump away the accumulated saliva as rapidly as possible. The "suction spatula" which I formerly used did not come up to expectation, for as in the case of other similar instruments, the saliva was only removed from the immediate neighborhood of the suction holes; it is better simply to put the pumping-tube into the throat. The use of the gag is often advantageous. Children's necks are very easily moved, and great care must be taken that the head is not unduly extended. The maintenance of the larynx presentation, when once it has been attained, is usually easy, but the view is apt to be limited to the short period of inspiration. Whether center-pressure autoscopes may be an advantage in children is as yet unproved. The procedure would scarcely diminish the autoscopic pressure, as this is in any case very moderate.

*Direct tracheo-bronchoscopy. Lower method.* There are no material differences from the procedure as carried out on adults. It is, however, very important in children with permanent tracheotomy tubes to use the short tracheal funnel described above, as this facilitates the accurate examination and treatment of the trachea in the neighborhood of the wound, and is especially useful in the region of the subglottic space. In examining the air passages the powerful movements of the lumen during respiration are very striking. Occasional forced expirations often bring about complete obliteration of the lumen accompanied by a

cough-like stridor. In the region of the smaller bronchi the movements of the lumen are very troublesome, as, owing to the swelling of the mucosa, the chance of satisfactory orientation is often dependent on the fleeting sight of the lumen obtained at the moment of inspiration. I have often noted this in cases of diphtheria. Every advance should be made cautiously, and where the presence of a foreign body is suspected, the result of the examination should not be deemed satisfactory until every branch on both sides has been presented, into which the foreign body might have been sucked.

*Upper method.* The upper tracheo-bronchoscopy of small children is one of the most difficult endoscopic pressures, and when the difficulties appear insuperable, beginners should be well advised to perform immediate tracheotomy, rather than exhaust the patient by fruitless attempts at introduction. If it is thought advisable to conduct the examination under local anesthesia, the technic of cocaineization described for direct laryngoscopy should be followed, and the air passages can be cocaineized through the tube after the larynx has been passed. The indications for general anesthesia have already been mentioned in Chapter II. To the special technic there mentioned should be added the recommendation that the autoscopic cocaineization of the larynx should not be undertaken until anesthesia is fairly deep, as the initial increase of reflex and the corresponding increase of salivation render the presentation of the larynx more difficult. It is helpful to pull the tongue out a little to limit its movements, whilst the use of a gag is often an advantage. The introduction of the tube calls for special mention, as departures from the technic normally applicable to adults are often inevitable. I shall put the normal procedure in the first place, the autoscopic introduction with the aid of a spatula in the second place, and the blind introduction with a mandrin in the third place. I will discuss the various procedures in this order, and will then consider their advantages and disadvantages.

1. The direct introduction of the tube spatula is naturally more difficult, owing to the diminished field of vision in children, than is ordinary autoscopes with a broad spatula. If the difficulties appear insuperable in the lying position, an attempt should be made in the sitting position, as I consider that this position is permissible, for a short time, even under a general anesthetic. If this fails, introduction in the left lateral position may be successful.

2. For autoscopic introduction with the aid of a spatula, an attempt should be made to present the

larynx with the autoscopia spatula; this is then directed somewhat obliquely, and the tube spatula introduced by its side and pushed through the glottis. The electroscope is then removed from the autoscopia spatula and fitted to the tube which has been introduced. Before the introduction, the light of the electroscope must be centered for the tube that is to be introduced, and should not be interfered with again.

3. Some authors prefer to introduce the tube blindly under the guidance of the fingers. To do this, a good elastic catheter should be used as a mandrin. This should project from three to four centimeters beyond the end of the tube, and should be bent with the finger so that it finds its way over



The position of the patient and assistant in upper tracheobronchoscopy. (After Jackson.)  
Fig. 12.

the epiglottis. When withdrawing the mandrin, care should be taken that the tube is deep enough in the trachea; otherwise the tube may slip out as well. This enumeration shows that a number of methods of introduction are available, and they can all be employed in the different positions of the body. An estimation of their relative practical worth is difficult to come by, as personal predilection—experience with intubation or familiarity with endoscopic routine—plays so large a part. Blind intubation is a comparatively easy procedure, though personally I have not much experience of it, but it is not in keeping with the fundamental endoscopic rule that the eye should guide the hand. I only advise its adoption by those accustomed to it in cases of extreme urgency, such as sudden dyspnea, and even in them I would urge the practice of autoscopia, as it is so indispensable on other grounds. Of the autoscopic methods, I would sug-

gest that the beginner employ the direct introduction in the sitting position, especially as this may be done under general anesthesia if the manipulation is fairly rapid. After some practice in this procedure, a trial can be made of the somewhat analogous procedure of introduction in the left lateral position. The localization of the delicate epiglottis is often difficult in children, owing to their restlessness and profuse secretion of saliva. Under no circumstances should the details of the first movement be slurred over, but the root of the tongue should be carefully defined, so that, when the tube spatula is held obliquely, it is possible to see along the side of it, the instrument thus serving for illumination and as a tongue spatula. If this maneuver fails, recourse must be had to the procedure detailed under heading 2, with the autoscopic use of the flat box spatula. Good anesthesia and complete fixation are indispensable for the last method, as both hands are occupied. It should always be a rule never to undertake difficult bronchoscopy in small children without proper preparations for assistance as regards fixation, anesthesia, and possible tracheotomy. The rules framed for adults must be accurately followed in performing bronchoscopy. It has already been mentioned that the larynx of a child, which is very narrow in proportion to its trachea, allows the use of relatively wider tubes on account of its plasticity. The mobility of the tube is a great advantage, but nevertheless orientation is always difficult, on account of the limited field of vision and the strong respiratory movements. A powerful light, clean inner tube, and the use of children's forceps and pumping tube, render operative procedures easier. In conclusion I would lay stress on the dangers of a too prolonged bronchoscopy in children, on the absolute necessity of an exact observation of the general condition, and on the possibility of subsequent subglottic swelling. The value of oxygen inhalation in this last condition is very great."

While not wishing to criticise Brunings' views in this chapter, the writer feels that the present status of tracheo-bronchoscopy demands that he take exception to certain statements in it. In a former chapter the writer said that he had been unable to find any special description of direct laryngoscopy in children. At that time he had not seen the chapter devoted to children, and he now wishes to take up certain statements contained in it and to discuss how they differ from the methods used in America. The writer is inclined to think from his own experience that Brunings emphasizes too strongly the difficulties of the examination of

the larynx in children. While it is true that all methods are difficult to the beginner, the writer is not willing to concede that the work is as difficult as Brunings would have us believe. He uses no anesthetic and the five-millimeter tube in small children to pass the larynx and, while bronchoscopy is more difficult in them than in adults, he has always been able to see and to work through the smaller tube. Brunings claims that it is practically impossible to manipulate forceps through a five-millimeter tube, but his claim is not borne out by facts. Foreign bodies are often removed through this tube, and after a little practice one can see through it distinctly. With the forceps devised by Large, quite enough room is left to see through the tube and to remove foreign bodies. As the writer has said above, one should practice with the small tubes at every opportunity; the eye soon learns to see through it and it becomes almost as easy to work through it as the larger tubes. It is undoubtedly true that the method of illumination in the Jackson instrument is better for small tubes than Brunings' electroscope. In children over five years of age, the seven-millimeter tube can be used; but in younger children it is safer to use the smaller tube because it can be kept in the trachea longer without danger of edema of the glottis. Jackson has rightly said that the great danger of edema lies in the use of large tubes, and for this reason one should be careful about using the seven-millimeter instrument in small children. It must be remembered that the trachea in a child is short and the diameter is much less than in the adult, so that one can sometimes see a foreign body through the laryngoscope, especially if it is of any size, for such objects do not get into the bronchi. A small tube about eight inches long is all that is necessary to reach these objects in the trachea. The writer advises all bronchoscopists to become expert with the small tubes and to use them in little children in preference to the seven-millimeter instrument. It is more than probable that no American bronchoscopist will agree with Brunings' views as to anesthesia in children. The use of a ten per cent. solution of cocaine for painting the larynx in older or younger children is dangerous and in the opinion of the writer is never justifiable. It is safer to use ether if one feels that the child must have an anesthetic, but in all cases seen by the writer up to ten years of age it has not been necessary. In direct laryngoscopy it cannot be too strongly emphasized that no anesthetic is necessary for either examination or operation. In children beyond the age of ten years, the indirect method usually succeeds.

It is not necessary to say anything further about position in direct laryngoscopy. The writer feels that the supine position with the head straight is so far superior to the sitting position in the case of children that no argument is needed to prove it. One has only to try the two positions to be convinced. The writer has never seen the difficulties enumerated by Brunings under "examination" if the child is securely pinned in a sheet and the head held straight—not over the end—on the table. It is almost impossible for the child to struggle much under such conditions, and, as described above, the examination usually takes only a few seconds. The writer cannot imagine anything easier in tube work than the examination of the larynx in children, provided the head is straight and the proper tube is used.

The examination of the trachea and bronchi with the head in the "Boyce position" is the same as in adults with the head and shoulders over the end of the table. The tube is passed in the same way and the operator assumes the same position.

*The writer's method of tracheo-bronchoscopy in children.* The methods are practically the same as described for adults except that the smallest possible tube is used. Under five years of age the seven-millimeter is never used, while over that age it can be passed without much danger of edema. In children below the age of two years, the writer's favorite tube is Jackson's five-millimeter tracheoscope, which is long enough to reach into the bronchi and, on account of its short length, is easily manipulated. It is always passed without the separable speculum with the head on the table and slightly extended. There is so little resistance in a child's throat that the tube is easily passed and, with slender, short forceps, one can work successfully through it. It is always well to give atropine before examining the trachea; children stand it well and it dries up secretions so completely as a rule that no pump is needed. It will be noted that the writer uses the straight position of the head in all his work; he has tried all methods and has come to the conclusion that it is the best position for the Jackson instruments, which he prefers to all others because they are simpler in his opinion and more easily handled. This may be due to the fact that he has worked so long and so successfully with these instruments. He feels sure, however, that with any instruments, the straight position of the head will simplify tube work. There is one thing in Brunings' chapter which ought to be remarked upon, and that is that he advocates that children's specialists should be qualified to do tra-



cheo-bronchoscopy. In this country such specialists are practically always medical men without surgical training. The writer feels that no physician who has not had long practice in manipulating instruments in the throat should attempt to do tube work. It is so difficult that many laryngologists do not try to master it, and it would seem unreasonable to expect the medical man to perfect himself in it. To illustrate the ease with which the bronchoscope can be passed with the head in the straight position, the writer wishes to cite two cases before taking up cases amenable to treatment of tracheo-bronchoscopy.

**CASE I:**—Four years ago, Dr. Frank Keating, superintendent of the Home for Feeble-minded Children, sent a feeble-minded boy to the University Hospital with the history of dyspnea and cyanosis. The boy had been out with an attendant a day or two before; the attendant left him for a few minutes and when he returned, the boy was lying on the ground, cyanotic and gasping for breath. He was immediately taken to the dormitory, where Dr. Keating saw him. The boy had been playing with papers and the supposition was that he had probably gotten a piece into the trachea. The boy, nine years old, was so terrified at the sight of the instruments that it was necessary to give him a general anesthetic. The head was held straight on the table and the small separable laryngoscope passed, exposing the larynx; the seven-millimeter bronchoscope was then passed through the larger tube into the trachea. The laryngoscope was removed, and just as the writer had begun to push the bronchoscope down, the boy stopped breathing. Despite the fact that the tube was kept in the trachea and artificial respiration resorted to, the patient became cyanotic and it was found necessary to remove the tube and to suspend him by his heels. He soon came around, and when he was fully awake an attempt was made to examine the trachea without anesthesia, but all in vain. The actions of the boy under anesthesia demonstrated that the obstruction was far down in the trachea, so that tracheotomy would have done no good. The anesthetic was again carefully given and the bronchoscope passed the second time. The head was immediately placed in the "Boyce position," and the tube pushed quickly down to the bifurcation, at which point the trachea was found almost closed by pressure from the left side. The bronchoscope was gently forced by the "scabbard" trachea and practically the same condition was found in the left bronchus, which was almost closed. The right bronchus was not affected. A diagnosis of mediastinal pressure was made with a bad prognosis. After the examination the boy breathed better temporarily, but the next day he was much worse, so that an attempt was made to give him some relief by passing the tube again. He was placed on the table and immediately died before anything could be done. A quick tracheotomy with the passage of the tube availed nothing. At the autopsy a mass

of glands which proved to be tubercular was found in the mediastinum pressing on the trachea and left bronchus, almost obliterating the lumen of both. Though treatment was of no avail, the diagnosis was made and it was demonstrated that straight bronchoscopy was easy.

**CASE II:**—In December, 1910, J. S., twenty-one years old, was referred to the writer by Dr. Winchester, of Charlotte, North Carolina, with the history of having inspired a scarfpin four days previously. The patient, while holding his little niece on his lap, grasped with his teeth the head of a scarfpin which she had placed in his mouth. Just at this moment he was compelled to cough and the pin slipped down between the vocal cords and stopped in the right bronchial tube with the head down. He had experienced little or not inconvenience from the foreign body except that on the sleeper the night before the movement of the train had prevented his sleeping on account of a sticking sensation in the right chest. An x-ray picture taken in Charlotte showed the pin in the right bronchus. That afternoon at the University Hospital the writer attempted to remove the pin under cocaine anesthesia. After a preliminary injection of morphine and atropine no trouble was experienced in passing the seven-millimeter bronchoscope. The pin was quickly located in the right bronchus with the point up and sticking in the mucus membrane. The writer reached for his forceps to remove it when the patient had a severe coughing spell and the pin disappeared. After searching for a while and not finding it, the writer thought it best to wait until the next morning when the patient would be fresh, and another x-ray would solve the mystery of the disappearance. The next day the patient decided he would take a general anesthetic for the second trial. The x-ray picture showed the pin in about its original position. After the patient was anesthetized, the nine-millimeter bronchoscope was easily passed through the large separable speculum and between the cords with the head straight on the table. The speculum was removed, and the head pulled over the end of the table in the "Boyce position." In passing the tube down in the trachea, the cough reflex was troublesome, probably from the irritation set up by the tube the day before, and cocaine had to be used frequently. For the same reason and despite the use of atropine, secretions gave much trouble. Finally, however, the bronchus was entered and the pin located, the point sticking in the wall of the bronchus as the day before. Prau's forceps with a straight foreign body tip were introduced and the point of the pin pushed down to disengage it from the wall. It was then a simple matter to seize the point and to pull the pin up into the bronchoscope, which proved too small for the pin to pass through, so tube, pin, and forceps were pulled out together. After extraction the pin measured three and an eighth inches long. The patient made an uneventful recovery and three days later returned to his home in South Carolina. The ease of passing the bronchoscope with the head straight in these two cases convinced the writer that the method was feasible and simple. Since

then he has used no other method in bronchoscopy. He is convinced that it, with the body elevated on cushions, will prove the simplest method for the beginner.

(To be continued.)

## SURGERY IN HOMES BY THE GENERAL PRACTITIONER.\*

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In this day of accessibility to hospitals and infirmaries most doctors are very prone to feel that the success of any operation is to a degree dependent upon such treatment as may be received in an institution equipped for their every need. This, to a certain extent, incapacitates some physicians from doing certain operations in the patient's home, while others simply for their own convenience do not care to do any kind of an operation outside of institution walls. On the other hand, there are innumerable patients who would submit to operative procedures if their physician would handle the case at the residence of the patient, when elsewhere they will not have it done at all. Many people still have a fear of hospital entrance which cannot be argued away.

It is a matter of common knowledge to any general practitioner that there are in his clientele dozens of women, for instance, with lacerations of perineei, cervixes, etc., who would probably agree to plastic operations if the physician would do the work at the patient's home. Some will readily go to a hospital; many who are able to go will not, and many are not able financially. Many will not go at all.

The term "general practitioner" in this article is meant to imply that the physician handles everything that comes to him—from a colic, or obstetrics, or gonorrhea, to an amputation or a laparotomy.

The average physician upon graduation may not be inclined nor feel competent to attempt some forms of surgery that may not be considered emergency in nature, and therefore refers many of his cases to some doctor who has access to a hospital or infirmary. In some cases the man to whom the patient was referred has been known to forever after retain the patient in his practice.

If the general practitioner cares to handle these non-major cases, the vast majority of them can be treated with surprisingly good results in the patient's home, and without trained nursing, if the patient prefers for financial or other reasons not

to enter an infirmary. This is not to be construed in any sense as an argument against hospital care. It is only to show that everything is not dependent upon it, and that the general practitioner can add to his usefulness and income without detriment to the interest of his patient.

If the general man feels "shaky" about his knowledge, he has as much access to his anatomy, works on operative surgery, etc., as any one else had to the same information. In fact, he should be absolutely sure, if possible, of what he is going to do, and to this end it is advisable for him to take post-graduate courses in operative work that he may the more successfully attempt this practice. The patient who prefers to have some surgical intervention done at home is just as much entitled to have a first-class operation as is the better situated patient who can afford all the luxuries and conveniences of a private infirmary combined with the skill of an expert. Therefore, *this paper is not advocating the attempt to do work by incompetents, but just the contrary.* Any doctor can prepare himself to do this work if he will follow the outlines given above.

Any physician who has handled a large mining camp practice knows the great number of serious injuries the miner receives, and the success in treatment achieved in these cases—the vast majority of which never darken the door of a hospital. There are even many major amputations done by the general man in the country with brilliant success which are never heard of by his more fortunately situated city brother. Frequently emergency laparotomies are done by the general man in isolated regions, especially for gun-shot wounds, where a wait for trains to convey the patient to a city institution would spell disaster.

With a White dental foot drill, using the ordinary dental burrs, many cases of open fractures have been wired with marked success. Those who have used the dental drill for this purpose will probably agree that it is a far better instrument for the purpose than the ordinary hand bone drill, and in some instances it has even been used in trephining the skull.

Among the large number of surgical procedures which the general practitioner can do as successfully at the patient's home as in a hospital may be mentioned the following:

All trachelorrhaphies and perineorrhaphies, all dilatations and curettements, paracenteses abdominis for acites, most amputations of extremities which involve parts of the arm below the shoulder joint, and of the lower extremity below the knee, opera-

\*Read before the Jefferson County, Ala., Medical Society, March 9, 1914.

tions for hemorrhoids and fistulae, buboes, excisions of Bartholin glands and most other accessible adenectomies, including tonsillectomies and adenoids, circumcisions, operations for small accessible aneurisms, a great many lipomas, harelips, emergency enucleations of the eye, certain kinds of minor orthopedic corrections, amputations of the cervix uteri, correction of bipartate uteri, most of the major kinds of simple closed fractures, paracentesis of the bladder when an imperforate stricture suddenly interferes, removal of foreign objects from any portion of the body, various lacerations, removal of many kinds of accessible polypi, all obstetrical operations which do not involve mutilation of the mother.

The educational preparation of the physician has already been referred to above. If the case is not an emergency one, and permits the doctor to appoint an hour for operation, as, for instance, a perineorrhaphy (and, by the way, the woman is most often the subject for all these operations), the patient should be very thoroughly examined—heart, lungs, blood, urine, etc.—and, if necessary, built up with the requisite treatment. The day before the operation a printed card should be left with the patient or some responsible member of the family, on one side of which is detailed the following matter:

#### OPERATION.

##### *To-morrow Morning at 8 O'clock.*

##### *For Nurse:*

(Check each order as it is complied with.)

##### *To-day:*

Prepare room by removing all surplus furniture.  
Wipe carefully the ceiling and all the walls with a dry cloth.

##### *To-night:*

Clean windows and doors and their facings with a damp cloth, using soap and hot water.  
Do not sweep, but clean floor with a mop, using soap and hot water.

##### *To-morrow morning:*

Have ready at 8 o'clock:  
Covered gallon bucket of water that has cooled after boiling.  
Covered gallon bucket of boiling water.  
Dishpan of boiling water.

##### *In operating room have:*

Fountain syringe.  
Four straight, plain chairs.  
One small center table.  
Three bowls or granite wash basins.  
One bar toilet soap.  
One small tub or slop jar.

One quilt.

Two sheets.

Twelve towels.

One kitchen table or ironing board with legs.

One hammer and four small nails.

On the reverse side of this card should be printed the following matter, which is for the patient's personal attention:

#### OPERATION.

##### *To-morrow Morning at 8 O'clock.*

##### *For patient:*

(Check each order as it is complied with.)

##### *To-night:*

Early light supper.

Full body bath, and, if the patient is a woman, hot douche of plain water.

Salts or oil three hours after supper.

##### *To-morrow morning:*

No breakfast.

Warm soap suds enema, and, if the patient is a woman, hot douche of plain water.

Bathe privates, thighs and buttocks.

Have on clean gown only.

Each article specified above suggests its use.

A printed diet card with the special diet for each patient indicated thereon should be given to the member of the family or other person who is to act as nurse. This minimizes chances for error to occur on this score.

The morning hour is selected for these operations because it gives the patient all day to recover, and there is much less liability of the doctor having to be recalled during the night.

The bed may be left in the room where the operation is to be done, provided it is not stirred up, and that the room is large enough otherwise.

When the physician arrives next morning he has with him his antiseptics, sterile dressings, etc., and his instruments collected together the night before and tied in a towel. Upon reaching the house, which should be at least half an hour before the time appointed for the operation, he places the tied instruments in the dishpan of boiling water for the half hour. Special sterilizers are unnecessary.

The patient is invariably given as a routine an injection of morphine, atropine, and strychnine. Whether the strychnine is of any benefit or not, its administration does no harm. It is suggested that this practice may be empirical, however. There is no denying that this preliminary treatment certainly does allay dread on the part of the patient, and allow a chance for sleep or rest, and freedom from pain for some time after the operation is completed.

Ether is probably the anesthetic of choice for a home operation, on account of its cost, ease of administration, and its great safety. The anesthetist ought to arrive a few minutes before the time designated for the operation, giving the patient an opportunity to get acquainted with him. The patient may be anesthetized on the bed or on the table, as is more convenient. Under no circumstances should either physician be late, because frequently the patient will for that account postpone the operation, and perhaps not have it done at all.

The doctor prepares himself during the administration of the anesthetic, and the patient, after she is on the table in the usual manner for the operation, but wants to bear in mind that operations done in the patient's home must necessarily be attended with more dependence upon continuous use of antisepsis during the operation than upon asepsis. With this idea constantly uppermost he will experience very little trouble in readily adapting himself to the situation, and soon learn to like the work in this field.

By using leg holders there is no need of having more than three people in the room identified with the operation—the anesthetist, the physician, and the person who is to assist him. In many cases this assistant could be the doctor's wife. In almost every neighborhood there is always some woman who is rather anxious to be considered able to help in operations, and the physician can give her working instructions as to what is meant by being surgically clean, and it is surprising how quickly this woman will take to the work. There is hardly ever any need of having a graduate nurse for the assistant, though it is more convenient. Of course, it is better to have a regular assistant on account of having someone able to anticipate the wants of the operator. Even an emergency abdominal operation in the country can be done with just three persons. For the class of operations listed in the beginning of this paper there is absolutely no need for more than the anesthetist, the operator, and the assistant.

The conclusions herein are derived from a series of these operations covering a period of ten years, and embracing nearly one thousand of the various operations combined. In the series referred to there were seven emergency gun-shot wounds of the abdomen which were operated upon in the country.

The mortality rate in operations done in the residence has been zero, except that of the seven abdominal gun-shot cases three died.

1626 SOUTH ELEVENTH AVENUE.

## PRACTICAL PROCTOCLYSIS. DESCRIPTION OF A SIMPLE APPARATUS.

M. IVERSEN, A.M., M.D.,  
STOUGHTON, WIS.

Proctoclysis is a method more or less familiar to all of us and very little that is new is likely to be presented. To me this subject has been of great interest since its inception, and I have utilized the procedure extensively. I am fully convinced that we do not employ it enough. I attribute the good results in my abdominal operations to the employment of Fowler's position, abundant drainage wherever indicated, and to proctoclysis.

I usually employ normal salt solution (0.6%) as recommended by Murphy, using up to ten pints, and then I drop to half normal solution, since it has been shown by T. Lawson (1908) and by H. H. Trough (1912) that tap water is absorbed as readily as if not more readily than a saline solution without any deleterious results. An excess of sodium chloride is harmful as is evidenced by dropsical changes in the tissues. In nephritis I use tap water only, as salt seems to interfere with the secretion of the kidneys. Murphy states that "this is worthy of consideration when we realize that the patient receives three and a half thousand to nearly thirty thousand grains of salt every twenty-four hours, depending on the manner of preparation, when being forced on an average of eighteen to twenty-four pints in twenty-four hours." Trough states that tap water relieves thirst better than salt solution, and some of his patients stated that they could taste the salt whenever the saline was resorted to. I have found that unheated water of room temperature is readily absorbed from the rectum. It is particularly effectual and harmless in fever cases, for we know that cold water by the mouth is relished much more than hot water, no matter how sick the patients are, and especially is this true when they have fever. Many collapse cases that have icy cold extremities accompanied by cold perspiration will on examination be found to have high rectal temperature. Why aggravate such a condition? The indication is to draw the blood and heat to the surface and to the extremities and this must be accomplished by means other than proctoclysis.

Proctoclysis is nearly always administered by the drop method at the rate of about sixty drops per minute. It has been found that when a greater amount is given at one time, even with intervals of rest, the rectum soon becomes intolerant and expels the liquid so that the whole treatment must be

abandoned. When the rectal temperature is subnormal, no amount of heat by proctoclysis at the rate of sixty drops per minute can possibly be effected. Drainage cases will take much more water so long as the drainage is effective. By combining drainage and proctoclysis the peritoneum and even a curetted uterus is made to exercise a secreting function instead of absorption. In order to obtain the best results in proctoclysis it should frequently be combined with hypodermatoclysis and venous infusion, as in cases where we wish to prevent thrombosis, in anemic or sclerotic patients or patients in a run-down condition. In such cases it is best to perform hypodermatoclysis on the table as soon as the patient is under the anesthetic, giving one to three pints, and after the operation give a rectal injection of one quart while the patient is still on the table. Proctoclysis may then be begun one hour or so later, after the patient has been put to bed. Such treatment will tend to prevent or eradicate shock.

I have used proctoclysis in a great variety of cases. In puerperal fever and toxemia, in infections such as typhoid, pneumonia, scarlet fever, and in alcoholism where the quiet muttering delirium had set in. Also after abdominal and gynecological operations, especially if there was suspicion of ileus or of infection, or when hemorrhage had occurred, the individuals ranging from infancy to extreme old age.

I have also resorted to proctoclysis for the purpose of rectal feeding by adding one to two tablespoonfuls of Trommer's malt extract with diastase to each pint of water. During the past summer I had an adult subsist during the first week following an operation for volvulus of the sigmoid, on this alone, until normal nutrition was reestablished. Of late the drop method has been used very successfully in Germany in the form of intravenous infusion (M. Friedman, *Munchen, med. Wochenschr.*, May, 1913) in thirty cases. Friedman gives from forty to 100 drops a minute continuously for eight, ten, and even twenty-four hours to support the patient until he has passed the crisis and reaction has set in. In threatening or desperate cases where other methods of infusion act too slowly or are unreliable, he adds alternately one grain of digalen or adrenalin solution every hour or two. Others have applied Murphy's method through the appendix after doing an appendicostomy (N. E. Allen, *J. A. M. A.*, 1910). In Murphy's *Clinics* of October, 1913, is an account that he gave 0.6% solution of calcium chloride by proctoclysis to a jaundiced woman for the purpose of aiding coagulation of

the blood so that an operation could be performed. The drop method has also been used for giving salvarsan by the rectum. So universal has the use of proctoclysis become that one can hardly take up a medical journal without reading something about it.

At a meeting of the American Medical Association in 1904, Murphy explained his method, and in 1906, Le Conte (*Annals of Surgery*) drew attention to the wonderful results he had observed in Murphy's clinic. The apparatus was composed of a so-called fountain syringe, a large rubber tube, and a vaginal tip. It was quite primitive and

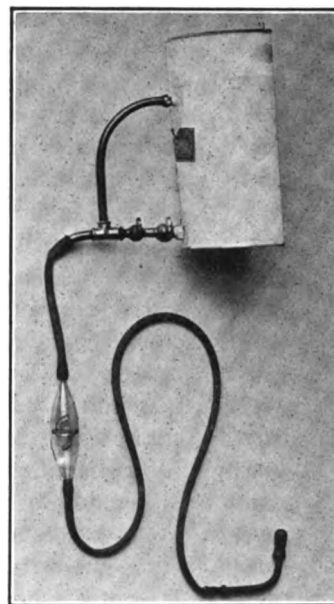


Fig. 1.

operated by static pressure. On August 17, 1907, Moynihan described a similar apparatus in the London *Lancet*. It was difficult for the nurse to handle and the bed was frequently soiled as a result. On April 18, 1908, G. B. Lawson published an account of his "regulator," which consisted of a medicine dropper fitted to the barrel of a glass syringe. This has been modified by many and was the original idea of the drop method that made the Murphy proctoclysis practical.

Macalpine (*Lancet*, June, 1908) described a very complicated apparatus by which he could warm the liquid on a small stove heated by an automatic lamp, and also count the drops as they fell into the funnel. He calculated that when Moynihan called for one pint an hour, he meant ninety drops per minute. Now, sixty drops per minute is thought to be about right. Dr. O. H. Elbert, of St. Louis, invented an electric unit through which he ran the

tube close to the rectum, delivering the saline solution warm. We now have several other heating devices. In the *J. A. M. A.*, April 17, 1909, Murphy published a drawing of his above-mentioned primitive apparatus which did the work as well as any until then. B. B. Wecksler, *J. A. M. A.*, added a can surrounding it and containing hot water. In March, 1909, G. Y. Saxon arranged a similar contrivance and his apparatus afterwards sold for \$12.00. He also insulated his tubes with asbestos and regulated the flow by a pinch-cock. All these seemed too artistic and complicated to me. All had a tendency to make the apparatus expensive and cumbersome.

Some were of the opinion that it was very important to keep the solution in the can constantly hot. In October, 1909, Harlein (*J. A. M. A.*) and I. M. Garrat (*J. A. M. A.*) reported the use of their vacuum bottles, the former an inverted one, the latter an upright one. A modification of Harlein's, mounted on legs, by P. Magnuson (*Surg., Gynec. and Obst.*, February, 1910), sells for \$12.00. He added a thermometer near the anus, and no doubt discovered that the water reached the anus quite cool. P. Wroth (*Surg., Gynec. and Obst.*, November, 1909) took up the discarded funnel method, but ran his tube practically between two hot-water bags near the anus. The Meinicke saline solution heater of 1914 is based on this principle. It is the latest addition to the proctoclysis armamentarium, so far as I am aware. It is a metal fountain syringe with a metal tube through which the rubber tube is drawn.

I have tried for several years to perfect an apparatus that would embody the correct scientific principles in a practical, simple form, and in June, 1909, I published my first report in the *Journal of the American Medical Association*. This apparatus was tried out by Dr. John B. Murphy and he reviewed it in the yearbook for 1910, and, according to Sharp and Smith, he uses it now in the Mercy Hospital. However, I have again improved it so that to-day it is a more simple, practical, and durable yet scientifically accurate apparatus. "The more simple the appliance the more practical it will prove" (Murphy).

My apparatus (Fig. 1) consists of a can with a spout in which two stopcocks are successively attached, one for starting or stopping the flow, the other for dividing it into drops. After the latter is set it is unnecessary to resort to any adjustment again, as the flow can be stopped or started by the first cock at any time. Next to the cocks there is a return pipe, the hollow handle of the can, for the

relief of back pressure of gases or of liquid. My two-way dropper (Fig. 2) is connected to the spout by rubber tubing. The regulation of drops by all former apparatus was difficult on account of the back pressure which caused the drops to be irregular and even stopped them entirely at times. In the central diaphragm of my dropper is a tube running downwards for the drops, and one tube running upwards for the gases. This eliminates the back pressure, and the drop flow constantly and regularly, to the great relief of all concerned. It also eliminates one of the rubber tubes. I have found this dropper of great efficacy and a trial by some of the most prominent surgeons with large experience with the methods of proctoclysis has won for the dropper their enthusiastic endorsement.

When the apparatus is in use the dropper should never hang higher than fifteen inches above the arms of a grown person, so that an excess of hydrostatic pressure of fifteen inches can be observed

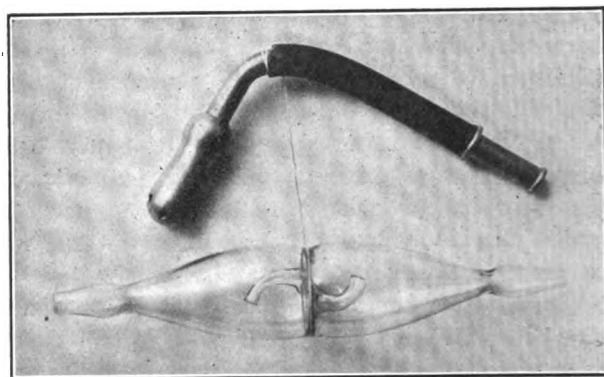


Fig. 2.

at once by the liquid backing up in the dropper. When this occurs, the flow should be stopped temporarily, as experiments have shown that the largest hydrostatic pressure that can be comfortably borne by the rectum without revolt is fifteen inches. More than that will cause the tip to be expelled and the liquid discharged into the bed. The patient soon learns to watch the dropper and to call the nurse when he sees the solution back up. The drops should be adjusted to flow about sixty per minute and about one pint should be given per hour with one intermission after every two hours. "Less than eight pints in twenty-four hours is of little use" (Murphy).

I use a rectal tip (Fig. 2) with an aluminum head with a number of large holes in it, and insulated by rubber outside of the anus. The bulb is automatically retained above the internal sphincter and is not easily expelled. When the liquid is



started warm, at about 120° F. in the can, it cannot very well fall much below the temperature of the room, the bed, and anus. The metal bulb rapidly assumes the temperature of the rectum and dispenses the drops at that temperature, a temperature which is undoubtedly least irritating. When only sixty drops per minute are given the amount of heat furnished or withdrawn from the patient, as the case may be, is negligible, and one need not give any further thought to heating the liquid except in cases of subnormal temperature of the rectum, where every possible precaution must be exercised. In such cases I place a drop-light of sixteen candle-power or one of these electric contrivances for boiling water in a tumbler into the can and run the rubber tubing between two hot-water bags placed near the anus. In such cases the new Meinicke saline solution heater might prove serviceable. The body temperature and the circulation must be sustained by other more energetic means, such as strychnin, adrenalin, hot-water bags, and brisk, long-continued rubbing under blankets.

The advantages of this apparatus are:

1. It relieves back pressure on the drops and by permitting the escape of gases gives comfort to the patient.
2. The drops may be regulated; they may be inspected, counted, started, and stopped immediately without interfering with the regulator after it is once set.
3. The hydrostatic pressure can be controlled and excess pressure prevented.
4. The tip may be left in the rectum continuously for the relief of gas pains.
5. If it is desired to run a full stream the liquid will run through both tubes in the dropper, making its removal unnecessary. This makes the apparatus practical as a douche or enema container. A dropper with only one opening would not give volume enough and would therefore have to be removed when a number of ounces of fluid is to be given during a short period of time.
6. It prevents soiling the bed to a great extent.
7. It may be suspended from the bed, from a nail, or it may be placed on the bed table. It matters not where it is placed so long as the dropper is not situated more than fifteen inches above the level of the anus.

We observe, therefore, that the apparatus as it is to-day is durable, cheap, simple, practical, and scientifically correct. It may be used for all regular and emergency purposes, as an instrument for proctoclysis, douche, irrigation, enema, hypodermatoclysis, intravenous infusion, etc. A hospital will

need only one set of cans and the practicing physician may utilize one can for all his work. Such an addition to our armamentarium is, I think, bound to still further popularize Murphy's drop method of proctoclysis.

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## THE USE OF THE SPHYGMOMANOMETER CUFF IN VEIN-TO-VEIN TRANS- FUSION.

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Direct arteriovenous transfusion has several disadvantages. Among these may be mentioned the following: The necessity of sacrificing an artery (usually the radial) in the donor. In order to prepare a deep-seated artery it is frequently necessary to make a very long incision and deep intermuscular dissection. Nerve filaments form a close network about the arteries and larger nerve fibers are frequently in such close relation to the artery that the necessary dissection under local anesthesia may become quite complicated. Branches from the artery demand careful ligation, often leaving knots in situations where they may interfere later in the establishment of the anastomosis, or the knots may slip off and cause bothersome bleeding. The artery may be in a state of vasoconstriction, which diminishes the lumen greatly and favors stasis and clotting at the place of anastomosis, and we have no effective means of overcoming this constriction.

In a vein-to-vein anastomosis these objections are largely obviated, and it presents as a whole a less delicate and less time-consuming operation. The possibility of any transfusion depends upon the difference in blood pressure in the blood-vessels used in the donor and in the recipient. In a simple vein-to-vein anastomosis this difference is much less than in arteriovenous anastomosis. Soresi for this reason advocated vein-to-vein anastomosis from the donor's arm to the recipient's external jugular, where the pressure is almost nil. A more serviceable method is the application of a tourniquet about the arm of the donor. This will cause the veins of the forearm to distend with a pressure equal to that of the brachial artery, if the tourniquet be accurately applied.

After having sacrificed the radial artery in a few cases of transfusion and having, besides, observed the other disadvantages mentioned above, I concluded to attempt a vein-to-vein anastomosis. The donor was a powerful man with large and prominent subcutaneous veins on the forearm, and

the recipient an almost exsanguinated hemophiliac. The posterior ulnar veins were chosen in both patients. A Brewer's glass cannula dipped in hot albolin was used for the operation, and adjusted into the veins. In order to raise the pressure in the donor's veins, it occurred to me that a pneumatic and controllable cuff about the arm might be more satisfactorily managed than the usual elastic bandage. A sphygmomanometer cuff was therefore applied around the upper part of the arm and inflated to a degree just short of shutting off the radial artery. All the veins of the forearm became greatly distended, including the one used in the anastomosis. A temporary withdrawal of the cannula from the vein of the recipient demonstrated a steadily flowing blood stream of great volume and force. The transfusion was rapidly and satisfactorily finished.

I have now had occasion to perform transfusion four times (two in one patient) by this method, and I have adopted the following general plan of procedure. The two patients are placed on properly cushioned operating tables with their feet in opposite directions. The left forearm of the donor is made to come in contact with the left forearm of the recipient on a padded board connecting the heads of the two tables. A sphygmomanometer cuff is placed about the upper part of the donor's arm and the blood pressure read. After aseptic preparation the posterior ulnar vein of the donor is dissected out by an assistant while a suitable vein is being similarly prepared on the recipient. The latter vein should be chosen nearer the elbow and more ventrally on the forearm (the anterior ulnar). The elbows are approximated and the two forearms are held up by an assistant, each at a right angle from the arm. The cannula is then inserted into the vein of the donor and tied in with catgut. The assistant compresses the vein against the muscles with a finger which relaxes every few seconds, allowing an instant of free flow to insure against clotting. The recipient's vein is opened and the other end of the cannula inserted. Both veins are tied loosely over the cannula with one double catgut slipknot which can be loosened quickly and later retied should it become necessary to inspect the flow or exchange cannulae. When this must be done each vein is gently compressed with a finger. Warm albolin is applied to all exposed tissues repeatedly during the operation. The sphygmomanometer cuff is now inflated until the index shows a pressure of ten or fifteen less than that previously ascertained to be the arterial pressure. All the veins of the forearm become greatly dis-

tended and a strong and steady stream is forced through the cannula. By carefully watching the veins at each end of the cannula it is not difficult to learn whether the transfusion is progressing satisfactorily or not.

After the transfusion has been successfully established it will become necessary to advise the assistant who manipulates the sphygmomanometer to vary the pressure from time to time in order to keep up the maximum tension within the vein. For best results, the inflation of the sphygmomanometer should strike the theoretical point where all veins are shut off and the brachial artery is left open. This would mean an even flow of blood through the cannula corresponding in volume to that of the brachial artery. The donor must be carefully and constantly watched and placed in Trendelenburg position immediately if this rapid loss of blood causes faintness or beginning of shock.

I believe that this steady and voluminous venous flow of blood is of distinct advantage over arterial transfusion in being less apt to cause clotting and in shortening the time of transfusion. Besides, it overcomes the other objections mentioned at the beginning of this article. For raising and controlling the venous pressure in the donor, the pneumatic sphygmomanometer is a most convenient and practical instrument.

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#### TO FIND GONOCOCCI IN THE FEMALE.

A common mistake in examining the secretion in the female is to take it from the vagina, which is full of organisms of all sorts. The three points from which secretion should be obtained for examination are: the cervix, the urethra, and Bartholin's gland. Gonococci are more likely to be present if the secretion be obtained just after the cessation of a menstrual period or as the lochia is beginning to diminish after the emptying of a pregnant uterus. If difficulty is encountered in demonstrating the organism in a suspicious case, slight traumatism to the points from which the secretion is to be obtained and the taking of the smears twenty-four hours later will sometimes result in more organisms being present in the discharge and thus facilitate their demonstration. A similar result may be obtained by a chemical irritation, such as the application of a strong solution of silver nitrate and the examination of the increased secretion thus produced.—CHARLES C. NORRIS in the *Long Island Medical Journal*.

# American Journal of Surgery

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**WALTER M. BRICKNER, M.D., Editor**

NEW YORK, AUGUST, 1914.

## THE AMERICAN JOURNAL OF SURGERY QUARTERLY ANESTHESIA SUPPLEMENT.

Recent years have been marked by some important contributions to the theory and, especially to the practice of surgical anesthesia as, for example, the introduction of Meltzer's intratracheal insufflation method and various mechanical devices for its employment, the oil-ether rectal anesthesia of Gwathmey, the intravenous injection methods for general and for local anesthesia. The next few years will no doubt see more innovations, for many men are working on various aspects of the subject. The administration of anesthetics has, indeed, become, in the cities at least, a specialty that is rapidly approaching the dignity of other surgical specialties; and several anesthetists' societies have been formed here and abroad, for the exchange of experiences and the comparisons of methods. But there has lacked what is now quite needed for the further scientific development of this alongside the other departments of surgery—a journalistic medium and editorial mouthpiece.

The AMERICAN JOURNAL OF SURGERY will be expanded to meet this need. Beginning with its October issue THE JOURNAL will publish a 32-page Quarterly Supplement devoted exclusively to anesthesia and analgesia. This supplement will be a complete journal within a journal, containing editorials, contributed articles and communications, abstracts, transactions of societies and book reviews.

The Supplement has been adopted as the official organ of the American Association of Anesthetists and the Scottish Society of Anesthetists, and it will publish also the transactions of other like societies.

The editor of the Supplement will be DR. F. HOFFER MCMECHAN, of Cincinnati, one of the founders of the American Association of Anesthetists, a charter member of the New York Society of Anesthetists and a frequent contributor to surgical journals. His editorial associates will be selected among men of international reputation in this field.

Primarily established as a medium for progressive anesthetists and their organization, this department of THE JOURNAL is also intended to actively serve the surgeon himself and to be a complete and reliable source of practical information for the large body of practitioners who include the administration of general and local anesthesia among their accomplishments.

Further details concerning the Anesthesia Supplement will appear in the September issue.—W. M. B.

## NURSES AS ANESTHETISTS.

The administration of anesthetics forms an exceedingly important part of surgical procedure. There has been a gradual tendency towards specialization so that to-day anesthetists are recognized as specially trained and experienced individuals. In many large hospitals, private and public, the function of administering anesthetics has been delegated to a non-medical person.

The legal status of trained nurses, insofar as the administration of anesthetics is concerned, has not been defined by law. Almuth C. Vandiver (*New York Medical Journal*, May 30, 1914) calls attention to the fact that the public health statutes do not specifically authorize nurses to administer anesthetics nor indeed is there any direct prohibition against this activity by nurses. Equally important is the fact that there appears to be no legal decision of the courts deciding that the administration of anesthetics by nurses constitutes the practice of medicine. While the technic of anesthetising has not been recognized generally in training schools for nurses, many nurses under private supervision have been fitted and qualified to administer anesthetics without endangering the life or health of patients.

The primary question to be determined is whether it be desirable to establish the legal status of nurses through legislative enactment so that they may be

authorized to serve as anesthetists. If such a procedure be desirable, it will become incumbent upon the medical profession, through the hospitals, to afford nurses—all of them, in course, or some of them specially selected—such practice under supervision as may be necessary to develop their efficiency in this phase of surgical assistance. It may be argued that a general medical training is essential to develop a careful and efficient anesthetist. The practical answer is found in the experience of large hospitals wherein nurses have been very successfully employed as anesthetists. If practically their employment has been advantageous to the surgical service without in the slightest degree endangering the patients, it is difficult to maintain that nurses with a lack of medical training cannot be efficient anesthetists.

From the standpoint of medical economics, there is naturally objection to the preemption of any part of medical work by others than physicians. In the development of social progress, however, the welfare of the community alone is considered and the particular disadvantage to any particular profession receives but little consideration. At the present time, it is safe to say that the work of anesthesia belongs to the medical profession. If nurses are to be given this field of work, it is because surgeons desire them to occupy it and are willing to give them the advice, training, supervision and direction necessary to enable them to master this important branch of work.

There is little necessity for arguing with legislatures nor for blaming the community when the solution of the entire problem is distinctly in the hands of the profession itself. There is only one question involved: "Do surgeons desire nurses to administer anesthetics?" If the answer be in the affirmative, the laws should be altered so as to include the administration of anesthetics within the activities delegated to the nursing profession. If surgeons are opposed to nurses as anesthetists, no legislation is necessary. It merely remains with the profession to discontinue the use of nurses in this capacity and to discourage their employment in hospitals, private institutions and private practice.—I. S. W.

#### DR. CRILE AGAIN HONORED.

The latest of the many recognitions this year bestowed upon Dr. George W. Crile is the 1914 *American Medicine* gold medal, conferred upon him as the American physician who, in the judgment of the trustees of the award, has performed the most conspicuous and noteworthy service in the

domain of medicine and surgery during the past year.

Monumental was Crile's work in the establishment of a safe method of blood transfusion. Equally large in effort and dignity are his very important contributions to our knowledge of shock. His development from them, more particularly from his kinetic theory of "anoci-association" methods in operating, is the particular achievement that has singled him out this year for various conspicuous honors here and abroad. Whether or not his teachings concerning shock and his anoci-association procedures will be as lasting additions to medicine as blood transfusion, these honors were fairly won.—W. M. B.

## Surgical Suggestions

In typical abdominal hysterectomy only three ligatures on each side are needed, viz., the ovarian vessels, the round ligament, and the uterine vessels.

Bilateral inguinal herniae that pop out on coughing and immediately recede when the patient is recumbent are usually direct.

Bones, like the tissues, are intolerant of foreign bodies. Don't be too enthusiastic in recommending metal plates or screws for fractures if non-operative treatment or the application of a bone graft gives promise of success.

The "pneumonia" that occurs as a post-operative complication is quite different in several respects from primary lobar pneumonia and especially in the prognosis.

Do not be too sure that a small breast tumor is not cancerous because the patient is young. Such a small tumor even in the breast of a young virgin is sometimes scirrhus.

If a patient with esophageal obstruction can painlessly swallow fluids, gastrostomy will increase his discomforts but not his nutrition.

As a rule the nature and consequences of a contemplated gastrostomy or colostomy for carcinoma of the esophagus or the rectum ought to be clearly explained to the patient himself. Many individuals would reject such temporary palliation, the employment of which without the patient's consent is justified only by complete obstruction.

## Surgical Sociology

Ira S. Wile, M. D., Department Editor.

### LOWER MORTALITY RATES.

The general tendency towards lowering the mortality rate is well exemplified in the data made available by the United States Department of Census since 1880. From a rate of 19.8 per thousand population in 1880 the mortality rate has fallen to 13.9 during 1912. This decrease is not due to any peculiar conditions within the United States, but is representative of the general and steady decrease in the death rate which is prevalent throughout the civilized world.

	1900	1911
Austria .....	25.4	21.9
England and Wales .....	18.2	14.6
France .....	21.9	19.6
Ireland .....	19.6	16.5
Italy .....	23.8	21.4
Spain .....	28.9	23.2
Sweden .....	16.8	13.8

Nearly two-thirds of the population of the United States is now included in the registration areas, wherefore there is greater reliability in the figures compiled for this country.

The mortality rate in the cities for 1912 was 14.9 and for the rural districts 13.9. The annual average from 1901 to 1905 was 17.4 for the cities as opposed to 14.1 for the rural districts. It is significant that the mortality rate in the rural districts manifests little decrease.

Practically the entire reduction of the death rate of the country is due to the lower mortality in the cities. This is readily explained by the immense improvement in municipal sanitation and hygiene together with the increased attention that is being given to lessening the stress and strain of city life through improved housing facilities, increased hospital and dispensary facilities, and a more adequate attention to the social and hygienic needs of the urban community.

The most marked improvements in the death rate are evident in the preventable diseases.

### DEATH RATE PER HUNDRED THOUSAND POPULATION.

	1900	1912
Typhoid Fever .....	35.9	16.5
Measles .....	12.5	7.0
Scarlet Fever .....	10.2	6.7
Diphtheria and Croup .....	43.3	18.2
Tuberculosis .....	201.9	149.5
Pneumonia .....	180.5	132.2
Diarrhea and enteritis, infants under two years.....	108.8	70.3

This decrease is an evidence of noteworthy effects from the campaign of popular education and legislative enactment.

On the other hand, cancer has increased from 63.0 to 77.0; cerebral hemorrhage (apoplexy), 67.5 to 75.7; organic diseases (endocarditis), 123.1 to

151.2; nephritis (Bright's disease), 89.0 to 103.1. It is patent that these diseases, more common to the middle period of life, have advanced to such an extent as to warrant wholesale investigations into their etiology together with a widespread educational movement for the purpose of spreading the present knowledge regarding the causative factors. The efforts to decrease the mortality from these last-mentioned diseases need to be enhanced through further investigation as to their specific origin in order to secure the most valuable prophylaxis.

The evidences of improved medical and surgical treatment with improved hospital conditions is suggested by the decrease in death from purulent infection and septicemia to 2.7 in 1912; abdominal tuberculosis, 1.3; hernia and intestinal obstruction, 11.9; gangrene, 2.7; amputation, less than 0.1; railroad accidents and injuries, 13.6; street car accidents and injuries, 3.0; fractures (cause not specified), 4.4.

In brief, a review of the mortality figures for 1912 is indicative of advances in medicine and surgery that should serve to quiet the opposition of those who are opposed to medical progress. The bookkeeping of the nation shows that the vast sums of money expended for medical and surgical institutions have been well invested. The decreased mortality rate among preventable diseases represents the dividends in human lives upon private and public investments.

### NIGHT WORK FOR WOMEN IN FACTORIES.

The Appellate Division of the Supreme Court of New York State has upheld the New York law forbidding the night work of women in factories. It is probable that an appeal will be taken to the Court of Appeals. The importance of this decision in the Appellate Division is not to be overestimated.

The effect of night work upon women is distinctly injurious. Loss of sleep, lack of life in the sunlight, irregular hours of eating, injury to eyesight, together with an increased likelihood of accidents, combine as factors to decrease resistance to disease. The physical strains and moral stress further tend to undermine the general well-being of the women obliged to work and forced into the factories to labor at night.

The experience of the world is a general agreement that night work is opposed to the best interests of the community. Fourteen nations have entirely prohibited the work of women during certain periods of the night by an international treaty which was signed by the representatives of Austria, Belgium, Denmark, France, Germany, Great Britain, Holland, Hungary, Italy, Luxemburg, Portugal, Spain, Sweden and Switzerland. Such work in this country has been prohibited in part by laws of

Massachusetts, Indiana, Nebraska, Pennsylvania, Oregon, South Carolina and Connecticut.

In the Report of the New York State Factory Investigating Commission reference is made to the hard and physically exhausting work done by women in factories and there is recognition of the fact that "the nervous strain resulting from monotonous work and speeding up, intensified by the piece-work system, when coupled with excessive length of working hours, can only result in undermining the whole physical structure of the woman, lowering her vitality and rendering her easily susceptible to the diseases that find their prey among factory workers." In its opinion the first step in the right direction is to decrease the length of the working day for women, and it believes that a statute is necessary to provide legally that no woman may be employed in a factory after a certain hour. While no specific recommendation was drawn, the commission felt that the most important factor to enable enforcement of laws as to the hours of women is some valid provision fixing a closing time.

It is difficult to determine the actual effect of night hours upon women in terms of surgical conditions. From a recognition of the general physical and moral hazard that is involved, together with a lack of hygienic conditions which exist in night occupations, it is apparent that night work of women plays a serious part in lessening their general health. To this extent, the law limiting the hours of women in night work at factories warrants the cordial support of the profession.

## Book Reviews

**Traité Médico-Chirurgical de Gynecologie.** By M. M. F. LABADIE-LAGRAVE, and FÉLIX LEGNEU. Octavo; 491 drawings, black and white and in colors, in the text; *Fourth edition* revised and enlarged. Paris: FELIX ALCAU, 1914. Price, \$6. (30 francs.)

This classic treatise appears in its fourth edition as the most complete single book on gynecology in the French literature. The authors' grouping of their material may well be followed as the most modern and rational classification of gynecologic affections. The first part of the book embraces the general aspects of gynecologic disease; the second part treats of their special features. The grouping of the latter is based upon established facts of pathology. All the conditions are thus embraced under the headings, *malformations, traumatism, acquired deformities, infections and tumors.*

The abundant references to the most recent development in gynecologic pathology, in experimental pathology and biochemistry, the addition in the text of the latest accepted surgical operations, amply illustrated by 135 new figures, all serve to emphasize the value of the book not only to the student, but also to the specialist. One especially noteworthy chapter is that on the complications and the sequelæ of gynecological operations, while another

chapter is devoted to a study of the pathologic relations between the genital and the urinary apparatus. The important question of radio-therapy in the treatment of fibromyomata and cancer of the uterus also finds ample place in the book.

**The International Medical Annual: A Year-Book of Treatment and Practitioners' Index.** 1914. Thirty-second Year. Octavo; 716 pages; illustrated. New York: E. B. TREAT AND CO. Price, \$3.50.

The thirty-second yearly volume of this medical annual maintains the high standard set by the previous volumes. It contains excellent abstracts on the most important literature of the past year dealing with the treatment of medical and surgical conditions.

In the section on therapeutics there is a special chapter by Profs. Von Noorden and Falta on thorium and its uses.

It is only rarely that one finds a year-book made up as this one is of numerous abstracts, which the reader can pick up not merely as reference material, but as interesting reading. The literary style of the subject matter is of the best, so that the reader is not bored by the monotony so commonly found in collective abstracts.

Although the contributors to this volume are almost all Englishmen, there is no partiality shown in the literature abstracted, for French and German periodicals are well represented.

The high class of the illustrations, of which there is a great number, also adds to the attractiveness of the book; while the completeness of the index, in spite of the alphabetical arrangement of subjects, leaves little to be desired. As a handy book of reference for recent advances in medicine and surgery this book, for its size, can certainly not be surpassed.

**Blood-Pressure in Medicine and Surgery: A Guide for Students and Practitioners.** By EDWARD H. GOODMAN, M.D., Associate in Medicine in the University of Pennsylvania. Octavo; 226 pages; illustrated. New York and Philadelphia: LEA AND FEBIGER, 1914.

This little book will be found to contain a very good exposition of the present state of our knowledge concerning blood-pressure. After a brief description of the physiology of blood-pressure and the various instruments used in its determination, the author discusses the pressure in various disorders. The chapter dealing with hypertension in nephritis is particularly good and the newer views of renal disease, as put forth by the French school, are discussed. The book is made particularly useful as a book of reference, as the titles of all articles referred to in the text are given as foot-notes.

**Progressive Medicine.** Edited by H. A. HARE and L. F. APPLEMAN. Vol. II. June, 1914. 460 pages. Philadelphia and New York: LEA & FEBIGER, 1914.

The volume contains reviews by W. B. Coley upon Hernia; by J. C. A. Gerster on Surgery of the Abdomen; by John G. Clark upon Gynecology; by Alfred Hengel upon Diseases of the Blood, Diathetic and Metabolic Diseases, Diseases of the Thyroid Gland, Spleen, Nutrition, and the Lymphatic System; by Edward Jackson on Ophthalmology. These reviews maintain the high standard for which these numbers are noted.

## Books Received.

**Diseases of the Rectum and Colon and Their Surgical Treatment.** By JEROME M. LYNCH, M.D., Professor of Rectal and Intestinal Surgery, New York Polyclinic; Attending Surgeon, Cornell Dispensary; Fellow of the American Proctologic Society, New York Gastro-Enterological Society, etc. Octavo; 583 pages; 228 engravings and 9 colored plates. Philadelphia and New York; Cloth, \$5.00, net. LEA & FEBIGER, Publishers, 1914.



**Guiding Principles in Surgical Practice.** By FREDERICK-EMIL NEEF, B.S., M.L., M.D., New York City. Small octavo; 180 pages; New York; SURGERY PUBLISHING Co., 1914.

**Medical and Surgical Reports of the Episcopal Hospital, Philadelphia.** Volume II. Edited by ASTLEY P. C. ASHHURST, M.D. Octavo; 427 pages; illustrated.

**Surgical Diseases and Injuries of the Genito-Urinary Organs.** By J. W. THOMPSON WALKER, M.B., C.M. Ed., F.R.C.S. Eng., Hunterian Professor of Surgery and Pathology, Royal College of Surgeons of England (1907), etc. Octavo; 879 pages; 45 plates (24 in color) and 279 text illustrations. New York; FUNK & WAGNALLS Co., 1914.

**Abdominal Surgery.** Clinical Lectures for Students and Physicians. By THORKILD ROVSING, Professor of Clinical Surgery, University of Copenhagen. Edited by PAUL MONROE PILCHER, A.M., M.D., Brooklyn, New York. Octavo; 477 pages; 136 illustrations. Philadelphia and London; J. B. LIPPINCOTT Co., 1914. Price, \$5.00.

## Progress in Surgery

A Résumé of Recent Literature.

**Pituitrin; Its Abuse and Dangers.** A. J. RONGY and S. S. ARLUCK, New York, *N. Y. Medical Journal*, May 2, 1914.

- "1. Pituitrin does not induce labor pains.
2. It should not be used in the early part of the first stage of labor, for its action is too transient.
3. It should not be used in complete inertia because of danger of rupture of the uterus.
4. It is contraindicated in cases of dystocia due to malposition or contracted pelvis.
5. It should never be used in cases in which a sudden rise of blood pressure may prove dangerous.
6. A single dose of pituitrin may be used as an adjuvant in cases where pregnancy is interrupted, either by catheter or bag, and only when contractions of the uterus have already set in.
7. It should be used only in cases in which the cervix is dilated or dilatable and the presenting part engaged in the pelvic outlet.
8. It should be used cautiously in cases in which the fetal heart sounds are feeble or irregular.
9. It should never be used unless a general anesthetic is within easy reach, for the contractions may become so violent that rupture of the uterus becomes imminent.

Finally, the conclusions reached in this paper are based purely on personal observations of the action of this drug in a very large series of cases. We feel that it may not be in accord with the experience of many other observers, still we maintain that in order to obviate many complications, which at times may become very dangerous, this drug should be used conservatively.

We appreciate its value when properly used; we realize its dangers when given injudiciously, and we cannot but advise the general practitioner to be conservative in its use."

**The Treatment of Necrosis of Uterine Fibroma.** GEORGE E. SHOEMAKER, Philadelphia. *American Journal of Obstetrics*, May, 1914.

The author advises the removal of all large or growing fibromata in order that necrosis may be prevented. He condemns the X-ray treatment because of malignancy which may be overlooked or of late complications which may follow. He favors vaginal removal of the tumors leaving the uterus if possible, or the ovaries if hysterectomy is necessary. The mortality depends upon the degree of infection at the time of operation and should be lowest in vaginal operations.

**Roentgen Diagnosis of Uterine Tumors With the Aid of Intrauterine Collargol Injections.** (*Roentgen-diagnostik der Uterustumoren mit Hilfe von intrauterinen Collargolinjektionen.*) I. C. RUBIN, New York. *Zentralblatt f. Gynäkologie*, May 2, 1914.

Rubin has experimented upon the cadaver by making intrauterine injections of collargol to determine the shape of the uterus in cases of myomata, carcinomata, polyps and congenital malformations. He has not yet attempted the procedure on the living subject and warns against the possibility in such an attempt of injecting the material into the peritoneal cavity.

**The Clinical Significance of Sarcomatous Change in Uterine Fibromyoma.** S. H. GEIST, New York. *American Journal of Obstetrics*, May, 1914.

Geist has examined 250 cases of uterine and cervical fibromyomata and found twelve which showed sarcomatous changes of various types. He concludes that sarcomatous changes are of comparatively frequent occurrence coming most frequently at the menopause. The diagnosis is difficult. Because of the possibility of malignant change, X-ray treatment at the menopause is hazardous. Panhysterectomy for myomata is the operation of choice.

**A Method of Non-Ligation of the Umbilical Cord.** (*Methode der Nichtunterbindung der Nabelschnur.*) A. N. RACHMANOW, Moscow. *Zentralblatt f. Gynäkologie*, April 18, 1914.

The author does not ligate the umbilical cord in normal cases in full-term infants. After the cord has ceased pulsating, usually in from twelve to eighteen minutes, the cord is enveloped in a piece of sterile gauze. The umbilical scar becomes more solid by this procedure and remains clean. In premature or asphyctic children or when there has been a maternal hemorrhage, however, the cord is ligated. The child must be watched for two hours post-partum, but Rachmanow rarely observes a secondary hemorrhage.

**The Relation of the Abderhalden Serum Reaction to Ovarian Secretion.** (*Zur Frage der Beziehungen der Abderhalden'schen Reaktion zur Sekretion des Ovariums.*) T. A. SOLOWJEW, Charcow. *Zentralblatt f. Gynäkologie*, April 25, 1914.

Solowjew experimented with the sera of a man, of women certainly pregnant and of girls who had not yet menstruated. None of the male sera or of the sera of young girls brought about the reaction. This circumstance brings the author to the belief that the ovarian hormones bear a decided relation to the reaction.

**Hemorrhage From a Corpus Luteum Cyst.** F. ADAMS, Sydney, Australia, *British Medical Journal*, April 5, 1914.

A married woman, aged 18, was suddenly seized with acute abdominal pain, vomiting and diarrhea; the abdomen was rigid, tender in each iliac fossa, particularly on the right. There was fever of 102 degrees F. Two days later menstruation set in. A week later the abdomen was opened, and the peritoneal cavity was found to contain a large amount of free blood. The appendix was found inflamed and removed. The left ovary showed a corpus luteum cyst through which blood oozed from a small sharply cut puncture.

**Concerning the Relation in Time Between Ovulation and Menstruation; as Well as a Contribution to the Corpus Luteum Genesis.** *Über die Zeitlichen Beziehungen der Ovulation und Menstruation. Zugleich ein Beitrag zur Corpus Luteum Genese.* ROBERT SCHROEDER, *Archiv. für Gynäkologie*, Band 101, Heft 1.

The histologic examination of a hundred specimens obtained through operation permitted of the establishment of a regular relationship between the menstrual history on the one hand and the phase of the endometrium and of the corpus luteum on the other hand. In the instance of a regular four-weekly period, the ripe follicle bursts from 14 to 16 days after the beginning of the last men-

struation. The corpus luteum is rapidly formed and corresponds in time with the premenstrual thickening of the uterine mucosa which it is responsible for. On the 24th to the 28th day following the beginning of the last menstruation, the corpus luteum becomes completely formed, the premenstrual conversion of the endometrium is completed, and now the anatomical menstruation begins. In the case of an impregnation the ovum must have arisen after the last regular and normal period.

**Functional Kidney Tests.** W. E. STEVENS, San Francisco, *Journal American Medical Association*, May 16, 1914.

Stevens reports the findings from the application of 108 tests, using in the majority of cases after catheterization of the ureters, the phlorizin, phenolsulphonephthalein and urea tests simultaneously to determine their comparative functional value. He remarks that to speak authoritatively one must be thoroughly familiar with their technic. This is specially true of the phlorizin test and to some extent with the phenolsulphonephthalein test. His method was to use three sets of two bottles labeled R and L for collections from the right and left kidneys. After catheterizing the ureters, 2 c.c. of an 0.5 per cent. of a phlorizin solution was intramuscularly injected. While waiting for the appearance of sugar, enough urine was collected in bottles numbered 1 for the microscopic examination and the quantitative urea estimation. As soon as the reduction of heated Fehling's solution became apparent on both sides, the urine was collected for fifteen minutes in bottles numbered 2. At the end of this time 1 c.c. of a phenolsulphonephthalein solution containing 0.06 per cent. of the dye was injected intravenously and the urine then permitted to flow into the two test-tubes containing a 25 per cent. solution of sodium hydroxid. As soon as the characteristic discoloration occurred in both tubes, the time of appearance was recorded and the urine collected for fifteen minutes in bottles numbered 3. The amount of urea was determined by two Doremus ureometers and the amount of sugar by two Lohnstein saccharimeters. The phenolsulphonephthalein estimations were made by colorimetric test-tubes, as described by Cabot. His conclusions, in substance are: In normal cases the phlorizin, phenolsulphonephthalein and urea tests show almost identical values for both kidneys. In the pathologic cases all three show almost equally low values on the diseased side as compared with the healthy side, thus showing their almost equal practical value. The simultaneous use of the tests as described tends to greater accuracy is not specially time-consuming or complicated and can be done by an intelligent nurse. Moreover, it gives positive assurance as to which kidneys is performing the most work. In pathologic cases a coincident lessened functional value on one side points unmistakably to a marked defect on the corresponding kidney. This with a normal functional value on the opposite side and satisfactory total functional values as shown by blood cryoscopy, the bladder phenolsulphonephthalein test, etc., would permit the removal of the diseased organ. A single renal test would not justify such an operation. Prior to operation comparative functional tests should be strengthened by tests of total renal function. The urea is the quickest test performed and with a minimal discomfort to the patient. It is not based on the elimination of a foreign substance. As compared with the phlorizin test, the phenolsulphonephthalein test is subject to fewer technical errors and is less time-consuming, a factor of no little importance to the patient as well as to the physician. On the other hand, the quantitative estimation of the excreted dye, even with the Duboscq colorimeter, is subject to a not negligible amount of error, while following phlorizin injection the estimation of sugar by means of the Lohnstein saccharimeter is mathematically correct."

**Atresia Recto-Vesicalis.** F. C. HERRICK, Cleveland, *The Cleveland Medical Journal*, June, 1914.

After reporting a case of recto-vesical atresia which was successfully operated upon in the fifth month of life, the author suggests the following points in the management of such cases:

Early operation, if possible within the first 48 hours of

life. With the child in the lithotomy position, and the hips highly elevated, a midline incision should be made where the anus should be. Dissect upward and backward with blunt and sharp dissection. If the gut is reached, it should be loosened, brought down as far as possible and stitched to the skin. If unsuccessful in reaching the gut, a left inguinal colostomy should be immediately done. Thrusting a trocar through the perineum, a procedure which has been suggested, is inaccurate and should not be done.

The above procedures have been only moderately satisfactory, and it is left for plastic surgery in the future to accomplish better results.

**The Practical Value of Posterior Urethroscopy.** M. ROTH AND T. MAYER. *The American Journal of Urology, Venereal and Sexual Diseases*, May, 1914.

Considerable experience is necessary for the correct interpretation of the pictures obtained by posterior urethroscopy. The most important cause of pathological changes in this region is gonorrhoea. Numerous abnormalities are found in patients suffering from sexual neurasthenia. The chief point made by the authors is that the importance of the local condition in the latter group has been greatly overestimated, for they have obtained cures in 80 per cent. of these cases by general treatment either alone or combined with local therapy that did not alter, in any way, the pathological picture in the posterior urethra.

**A New Operation for Varicocele.** (*Eine neue Methode zur Operation der Varikokele.*) R. FRANK, *Zentralblatt für Chirurgie*, April 4, 1914.

The conventional operation (resection of the pampiniform plexus and approximation of the two ends) according to Frank possesses the great disadvantage that it not uncommonly causes digeneration of the testis. Frank has devised the following operation to obviate this. Inguinal incision; dislocation of the testicle through the wound and division of the Hunter ligament, so-called, which fixes the testicle to the bottom of the scrotum; a narrow flap of fascia made from the aponeurosis of the external oblique is then formed with base downward; this is turned down into the scrotum and sutured to the divided Hunter ligament; closure of the wound. In this operation, as is obvious, the testis is turned upside downward. Frank's results have been excellent both functionally and cosmetically.

**Concerning Dystrophia Adiposo-Genitalis.** JOHANNES WEICKSEL, *Münchener Medizinischer Wochenschrift*, June 2, 1914.

The case of a youth of 15½ years is reported who showed all the evidences of the Fröhlich symptom-complex, although the sellaturcica as revealed by the x-ray was not appreciably enlarged. His weight was 136 pounds; his height, 148 cm; chest circumference, 96 cm. Another striking feature in this instance was the presence of a marked eosinophilia. The mentality was not alert, yet the boy was graduated from the public school.

**A Useful Modification of the Adhesive Plaster Dressing in Operations for Hare-Lip.** (*Eine Zweckmässige Modifikation des Heftpflaster Verbandes bei Hasenschartenoperationen.*) R. HAGEMANN, Marburg, *Zentralblatt für Chirurgie*, May 23, 1914.

This modification consists simply in applying the adhesive plaster so that the middle part lies directly over the mouth instead of over the suture line. In this way the suture line can be kept cleaner and under better observation; furthermore, it holds the upper lip perfectly passive, even when the child cries. The plaster is applied so that a small opening exists at the upper part of the mouth through which nourishment can be taken.

**Splanchnoptosis and Its Treatment.** (*Die Splanchnoptose und Ihre Behandlung.*) O. WIEDHOPF, Heidelberg. *Deutsche Zeitschrift fuer Chirurgie*, Vol. 128, Parts I. and I.

By a careful analysis of the literature the author demonstrates that any type of visceral prolapse depends primarily upon a disturbance of the balance between the volume of the abdomen and the volume of the abdominal contents. The volume of the abdomen is invariably relatively increased. The treatment should be directed towards restoring the correct balance. This may consist in increasing the abdominal contents by forced feeding or in decreasing the volume of the abdomen. The latter may be accomplished by such conservative measures as strengthening the tone of the abdominal musculature or by the wearing of a band. Surgical measures are occasionally indicated, however. They consist in plastic operations on the pelvic floor or on the abdominal wall.

The following procedure is advocated by Wiedhopf: Long median incision. Opening of sheaths of both rectus muscles and freeing of both muscles from their sheaths. Extensive overlapping of the posterior sheaths, and fixation of the fold thereby made. Overlapping of the recti. Treatment of the anterior rectus sheaths in the same manner.

The author argues that this procedure is physiological, reducing the volume of the abdomen to the appropriate size. He believes that all organopexys should be given up for they attempt to overcome the manifestations and not the etiology of splanchnoptosis.

**An Experimental Study of Intestinal Obstruction.**

J. A. HARTWELL, J. P. HOQUET and F. BEEKMAN, New York, *Archives of Internal Medicine*, May 15, 1914.

There are two factors at work in producing the symptoms and causing death in this condition. First, the loss of water from the tissues, due to excessive drain into the bowel in response to the irritation set up by the retained secretions. This water may be replaced by subcutaneous injection of normal saline solution, and the symptoms caused are thus entirely controlled, with a saving of life. Second, the entrance into the circulation of poisonous materials, which occurs only when the mucosa of the bowel is damaged—the absorption of a poison from any source whatever, so long as the mucosa remains intact, is not a factor.

The development of a bacteremia as a cause of death is excluded.

**Supraclavicular Anesthetization of the Brachial Plexus.**

**A Case of Collapse Following Its Administration.**

H. NEUHOF, New York, *Journal American Medical Association*, May 23, 1914.

Supraclavicular anesthetization, a method introduced by Kulenkampff, is described by Neuhoef. He reports a case showing a possible accident from this method, the only one heretofore reported and which attributed to intoxication of the novocain employed or to trauma of the brachial plexus. There were no serious after-effects and the patient was approximately normal in twenty-four hours. The area for injection is the space bounded internally by the subclavian artery and externally and below by the clavicle and in the depths by the upper surface of the first rib. Several guides for the introduction of the needle have been described, but there is no doubt that the subclavian artery should be the one employed, as there may be several variations in its course. The position of the artery having been absolutely determined, the needle is immediately introduced external to the vessel at a point directly above the clavicle. It is introduced slowly and is directed downward, forward and inward. The best guide, Neuhoef says, for the path of the needle is the spinous process of the second dorsal vertebra. The latter should be marked on the skin and the needle be pointed directly toward it. There is one clear indication that the needle is at the plexus; which is that paresthesias appear in the hand and arm, in the medial or radial distribution, or both, and nothing should be injected until they appear. If they appear in the medial distribution alone, the needle should be introduced a few millimeters deeper for the second half of the fluid, as the median is rather superficial at this

point. The solution usually employed is 2 per cent. novocain, combined with epinephrin. The anesthesia of the arm is usually complete enough for any operation, though it may be incomplete in about 15 per cent., or less, according to the experience of the operator. It has been used in about 250 cases successfully, but this is hardly sufficient experience to permit sweeping conclusions. Temporary paralysis of the diaphragm has been reported several times, and Neuhoef thinks that the method is contra-indicated for patients suffering from pronounced intrathoracic disease. The only other reported complication is a single instance of musculospiral paralysis. Neuhoef thinks it will prove a valuable addition to the methods of regional anesthesia when serious complications can be insured against.

**Elephantiasis and the Kondoleon Operation.** H. A.

ROYSTER, Raleigh, *Journal American Medical Association*, May 30, 1914.

A case of elephantiasis successfully operated on, with continuous post-operative improvement, is reported by Royster, who specially testifies to the benefit derived from the operation described by the Greek surgeon, Kondoleon. The enlargement was confined to the right lower leg and foot. The circumference of the calf was 22 inches, above the ankle 18 inches and of the foot 14 inches. The skin was hard, thick and rough and the diagnosis of elephantiasis unmistakable. "For four days previous to the operation the man was put to bed; each day the leg and foot were scrubbed in a strong mercuric chlorid solution, bandaged tightly with a cotton-flannel roller and kept elevated on pillows. As a result of this, the leg was reduced in size about 2 inches. January 3, 1914, the operation was performed as follows: A long incision was made through the skin on each side of the leg, extending from the knee to the ankle. Wide retraction of the integument was secured by dissecting it back freely from each edge of the incision. Going from above downward the deep fascia to the width of three fingers was dissected off the muscles and cut away in one piece of the length of the wound. Also, the same area of subcutaneous tissue was removed by splitting it off the skin. The muscles were laid bare and free hemorrhage occurred, requiring many ligatures. The skin was stitched back in position, dressings applied and the leg bandaged without a splint." The auxiliary treatment consisted in the hypodermatic administration of thiosinamin every three days over a period of two weeks while the patient was in bed. About three months later an intravenous injection of salvarsan was given empirically to combat any microbe or parasitical infection, though they had been unable to demonstrate such. The principle involved in the Kondoleon method is that by removal of the deep fascia there is brought about an anastomosis between the deep and superficial lymph spaces. The foot in this case is still enlarged and another operation is recommended, provided it can be performed without injury to the tendons.

**The Use of Herudin in the Transfusion of Blood.**

H. S. SATTERLEE and R. S. HOOKER, New York, *Journal of American Medical Association*, June 6, 1914.

Herudin is the active principle of a secretion of the buccal glands of the pondleech, *Sanguisuga medicinalis*, and has been classed by Franz as a secondary albumose. It would appear from the available evidence that it has a decided effect on the prothrombin and antithrombin balance, and that it has a neutralizing action on thromboplastin. The authors give a diagrammatic illustration of this action. There is considerable literature on the experimental use of herudin, and there are some reports on its therapeutic use by intravenous injection for eclampsia; but no mention of its use as an anticoagulant for transfusing blood. The authors say that from their experimental work, it affords a convenient alternative for the paraffin method of transfusing under most circumstances. The amount required is so small that it may not be contra-indicated even in pathologic conditions in which there is an excess of antithrombin or a deficiency of prothrombin in the circulating blood. It would appear from the literature that it is not dangerous by intravenous injection except in large doses. The authors' first aim was to determine the minimum amount of the substance

that would serve to prevent coagulative changes long enough to permit safe transfusion under the best technic. From their experiments it was estimated that about 3.5 mg. of herudin to 100 c.c. of blood would be requisite, without the aid of paraffin, provided good technic was employed in obtaining the blood free from a mixture of tissue juices. When a paraffin coating was applied to the tip and neck of the transfusion pipet, the amount could be reduced by half. These results are shown by a table presented. Directions are also given as to the paraffin coating in the practical application of the method.

**The Rôle of Orthopedic Apparatus in the Treatment of Surgical Tuberculosis by Sunlight.** P. REDARD, Paris. *Annales de Médecine et Chirurgie Infantiles*, May, 1914.

The author believes that in the enthusiasm which has followed the excellent results obtained in the heliotherapeutic treatment of surgical tuberculosis, the rôle of orthopedic apparatus has been much neglected. Whereas there is no doubt that the very mild types of cases, especially those in which joints are not involved, will heal when exposure to sunlight is used alone, the more serious cases should be treated by means of apparatus besides. In general, heliotherapy is difficult when casts are used, and for this reason the immobilizing apparatus should be simple in order to allow as much of the body as possible to be exposed to the light. Casts when used should contain numerous fenestrae.

**The Etiology of the Ulcus Ventriculi: A New Theory Based on Experimentation.** (*Zur Aetiologie des Ulcus Ventriculi; Eine Neue Theorie auf Experimenteller Grundlage.*) B. STUBER, *Münchener Medizinischer Wochenschrift*, June 9, 1914.

Basing his theory on the clinical observation that a considerable number of patients with ulcus ventriculi vomit bile and intestinal content, Stuber sought to produce in animals distinct ulcers of the stomach. By excising a square area of the musculature of the pylorus he first induced pylorus-insufficiency. This lasted for about a month. During this time he fed the dogs only bread, potatoes and milk with the object of diminishing the well-known hyperacidity of these animals. In all these animals there were found in the course of three months multiple ulcers situated chiefly at the antrum of the stomach and on the lesser curvature. The animals manifested symptoms which were not unlike those in the human under similar pathologic conditions. Blood was noticeable in the feces. In a similar number of animals used for control, the pancreas was ligated at the same time, as the pylorus was rendered insufficient. In these animals no ulceration resulted.

Hence, Stuber feels justified in the conclusion that under pathologic conditions as imitated by his experiments, it is possible to cause an increased and more frequent regurgitation of intestinal ferments into the stomach, and consequently typical ulcera ventricula. When trypsin is fed by mouth, healed ulcers become again disturbed and typical ulcers may again be formed. Stuber calls this type of ulcer ulcus trypticum and suggests that very likely the same condition may obtain in man.

**Anatomico-Pathological and Experimental Study of the Surgery of the Orifices of the Heart.** A CARREL and TH. TUFFIER, Rockefeller Institute, N. Y., *The Medical Press and Circular*, May 27, 1914.

The authors report an investigation of the pathological anatomy and clinical aspects of cardiac surgery and the experimentation required to develop satisfactory operative technic. They believe that pure mitral stenosis, certain aortic stenoses and some stenoses of the pulmonary artery will be found to be susceptible of benefit by surgical intervention. Only those cases which are progressing rapidly to a fatal termination are suitable for this treatment. Surgery might then transform a sure fatal stenosis into a relatively mild insufficiency.

The following are the chief dangers to be avoided in

such interventions: Wounds of the coronary arteries, hemorrhage, entrance of air into the cavities of the heart and arteries, and finally thrombosis.

The coronary vein may be tied with impunity, but not at its extremity, owing to the supply of venous blood the heart derives from the foramina. Lesions of the peripheral portion of the coronary artery are well borne. A wound of the coronary artery near its origin, even when made with the finest needle, always causes momentary arrest of the heart's action, which is followed by a relatively prolonged arrhythmia. Application of a ligature between the origin and bifurcation of the coronary artery is always fatal; the heart is arrested in diastole and resuscitation is impossible.

The occurrence of hemorrhage is not so serious—obliquely directed wounds of the heart will bleed less freely than others. The one hemorrhage which is most difficult to arrest is that occurring when the right auricle is torn, owing to the extreme thinness and friability of its wall.

Air embolism entering the right side of the heart is not as serious as that on the left side on account of the cardiac anemia resulting from emboli in the coronary arteries.

The slightest degree of myocarditis leads to thrombosis. Wounds must, therefore, be absolutely approximated.

The topography of the heart in regard to those zones which are dangerous to manipulate and those which are manageable is next discussed. The danger zones are the proximal portions of the coronary arteries; the interauricular septum, the auriculo-ventricular border. The left auricle is particularly amenable to approach. The endocardium is much more sensitive than the other cardiac tissues, doubtless through the influence of the sub-endocardial nerve plexus. The parenchyma of the heart, however, is extremely tolerant of approach, so that the cavities of the heart may be opened singly and their walls resected, without grave injury to the ulterior functional capacity of the organ.

The remainder of the paper deals with a detailed description of the operations performed. Three procedures may be used in dealing with orificial stenosis: internal valvulotomy, which is analogous to internal urethrotomy; external valvulotomy including cardiotomy, and finally auriculo-ventricular or arterio-ventricular anastomosis, which consists of placing the segment of the vascular circle which is situated in front of the constriction in communication with that beyond the same, through the medium of a "derived" canal.

**Operation vs. Irradiation.** (*Operation oder Bestrahlung.*) CHRISTOPH MÜLLER, *Münchener Medizinischer Wochenschrift*, June 2, 1914.

The number of cases of carcinoma so far treated by x-ray and radium has not been sufficiently large to make comparative deductions. But three years have passed during which time a fairly large percentage of the cases so treated has remained without recurrence. Compared to a similar number of cases surgically treated the results according to Müller are more favorable with the non-operative form of treatment. Besides, the superior advantage of irradiation is in those anatomical regions where surgery has no approach as in the thorax. Lung and pleural metastases can be subjected to the x-ray; carcinoma of abdominal viscera including their regional lymph nodes can also be attacked by the ray. While the brilliant results obtained through surgical technic cannot be gainsaid, Müller urges that the work with the radio-active substances be further promoted, as already they have been proved to be a potent means against cancer.

**Treatment of Pruritus ani.** J. CRAPPER, Chepstow, *British Medical Journal*, May 2, 1914.

Crapper recommends two simple remedies, both of which in his experience are remarkably efficient. The first is ordinary Tr. Iodine; the second, and even better remedy is the compound tincture of Benzoin. Within a minute of two after applying this remedy, the desire to scratch is over. It may be used two or three times daily and it never irritates.

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## IONIZATION TREATMENT OF CANCER; END-RESULTS OF TWENTY YEARS' WORK; A SUMMARY OF 300 CASES.\*

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On July 31, 1893, I discovered by accident that a local cancerous growth could be conveniently devitalized by driving into it certain parasiticial chemicals by a direct electric current. Since that date, now more than twenty years ago, a large portion of my time has been spent in improving the technical details of this process and ascertaining its indications and limitations. Another worker in the same field, Prof. Stephane Leduc, of the School of Medicine of Nantes, France, has done much to clear up the exact nature of the electrochemical reactions involved, and has shown that the essential agent in this method of tissue cell devitalization is the ion of the electrolyzed zinc anodes, the ionic state of the nascent atoms of zinc released by the current permitting them to be driven by it into chemical union with the contents of the cells of the growth, where they lose their ionic state and combine with the cell constituents, producing new compounds that are dead and sterile.

During the years mentioned other physical agencies have been discovered and employed in cancer therapy, notably the Roentgen ray and radium, all of them having had attention at my hands. It has been only in my failures with ionization, nevertheless, that I have turned to other methods, none of the successful results illustrated and tabulated in this paper having received any other treatment than ionization, though many were previously failures under other methods.

The most recent technic adopted in the ionic destruction method is its bipolar application, in which the whole of the growth is directly included between the electrodes of the ionizing current, the electrodes yielding the ions of zinc being inserted at the peripheries. This permits of the use of a more powerful current under which the zinc electrodes are quickly ionized and a large growth turned white, devitalized and sterilized in from twenty to thirty minutes without tetanizing nearby

structures, under either local or general anesthesia. This technique has been used whenever possible since 1906 and most of the good results to be reported were obtained under it; though thirty-five of the 129 patients remaining free from the disease were placed under the older, unipolar method from eight to seventeen years ago.

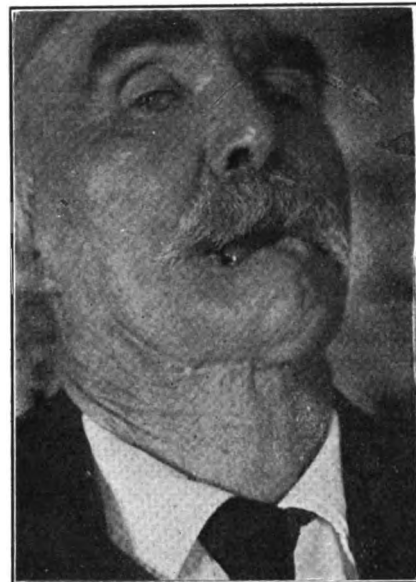


Fig. 1. Scars four years after ionic operation for carcinoma of lower lip and glands of neck.

TABLE A.  
Statistics of 300 Cases of Cancer under Ionization Treatment During the Twenty Years between 1893 and 1914.

	No. Cases	Cured	Died	Per cent. Cured
Operable Epitheliomas .....	66	62	0	...
" Carcinomas .....	25	23	0	...
" Sarcomas .....	2	2	0	...
Total Operable Cases .....	93	87	0	93.5
Inoperable Epitheliomas .....	24	17	0	...
" Carcinomas .....	159	18	10	...
" Sarcomas .....	24	7	1	...
Total Inoperable Cases .....	207	42	11	20.2
Mortality per cent., all cases, 3.6; of inoperable cases, 5.3.				

Table A indicates the results of the ionization treatment of the three hundred patients with malignant growths placed under the method by me between its inception, July 31, 1893, and December 31, 1913. The cases include all so treated in this period of over twenty years, many of them having been received in a condition that would now be regarded as contraindicating the method. These results have been brought down to the present moment in the cases of living patients and to the

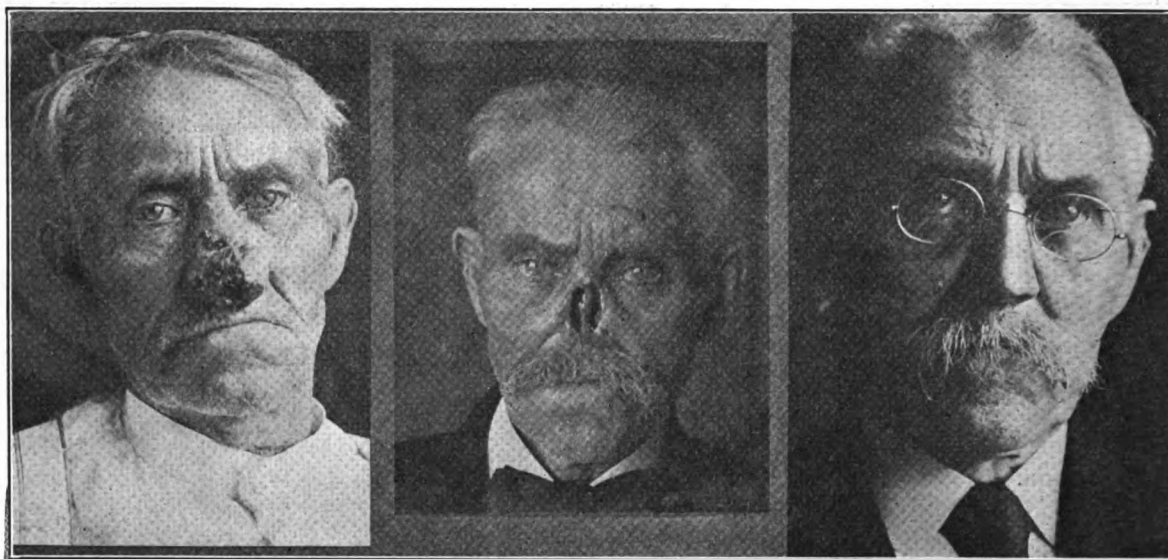
\*Read before the Philadelphia County Medical Society, March 25, 1914.



time and nature of death of those who are known to have died in this rather long time.

The table shows that 129, or 43 per cent. of all

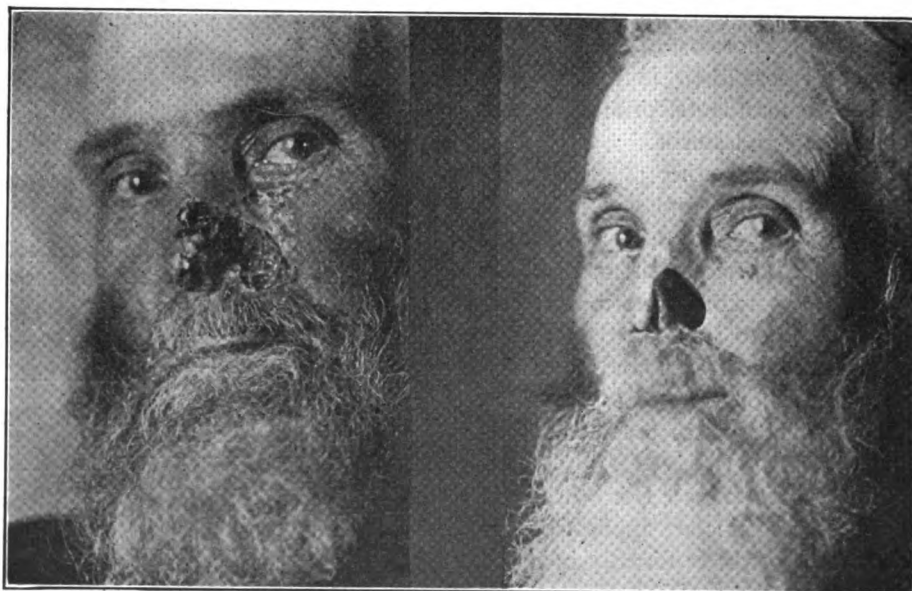
Of the 207 that were classed as inoperable in the ordinary surgical sense, 42 were cured, a percentage of but 20.2.



Before treatment Two years after treatment With artificial nose attached to spectacles  
Fig. 2. Squamous cell epithelioma of nose. One bipolar major ionic operation of 200 to 700 milliamperes for forty minutes.

patients treated, have shown no return of the disease, at least 85 of which have passed the three-year period and are living at present without recurrence or metastasis, as shown in Table B. Twenty-four

Time Since Treatment of		TABLE B.	
the 129 Patients of Table A showing		No Disease	
1 patient has	passed 17 years	13	"
1 "	"	12	"
2 patients have	"	11	"
1 patient has	"	10	"
7 patients have	"		



September 5, 1909 June 18, 1910  
Fig. 3. Epithelioma of nose.

ty-four have not yet passed the three-year point since treatment, though still free from recurrence or metastasis, and twenty have died since treatment of some affection unconnected with cancer.

Of the operable cases, a total of 93, 87 were cured, a percentage of 93.5.

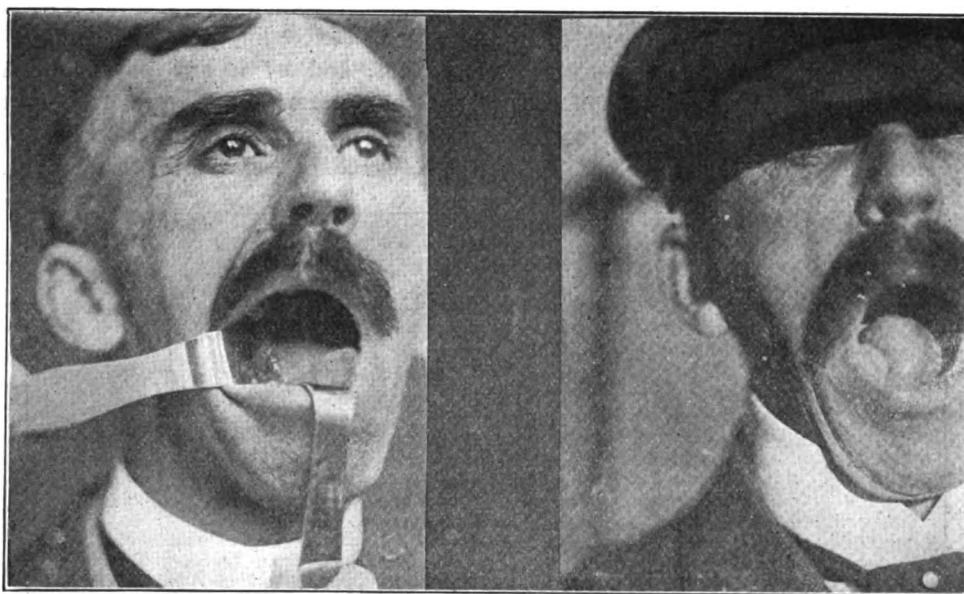
12	"	"	"	9	"
11	"	"	"	8	"
18	"	"	"	7	"
14	"	"	"	6	"
5	"	"	"	5	"
6	"	"	"	4	"
7	"	"	"	3	"
6	"	"	"	2	"
12	"	"	"	1	year
6	"	"	"		less than 1 year
20 patients have died since treatment of other affections, without recurrence.					



A great majority of the inoperable cases were recurrences after excision operations. The difficulties attending the successful application of this

growth and is apt to suggest a less extensive destruction than needed.

The mortality of 3.6 per cent. refers to all growths



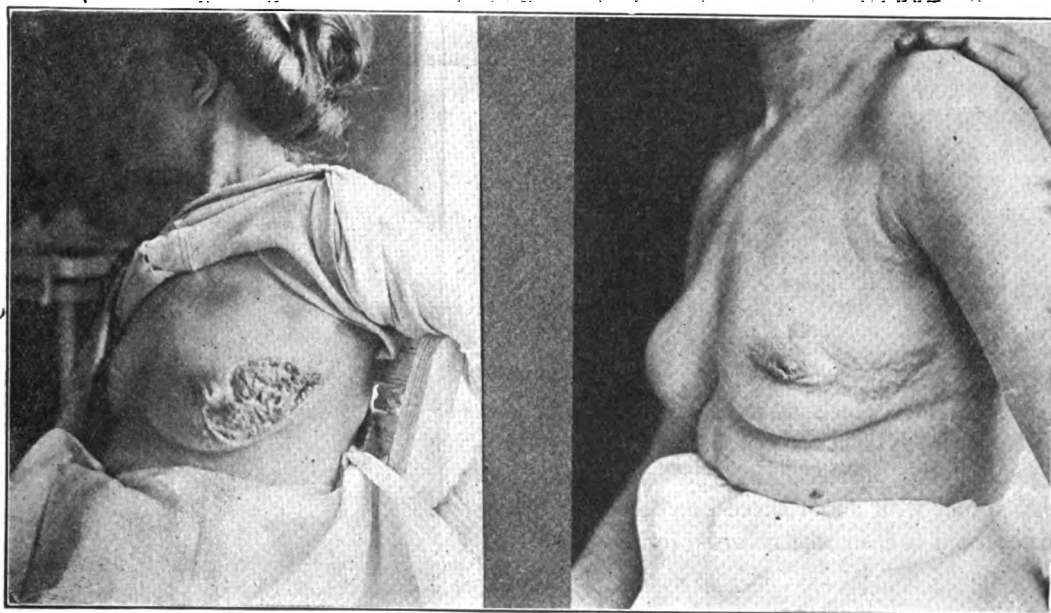
Before treatment, October 10, 1911

After treatment, December 6, 1911

Fig. 4. Squamous cell epithelioma of tongue.

method in recurrent cases are indicated when I state that but 15 of the 129 cures were obtained in patients that had been operated upon previously by

treated. As the operative deaths, mainly from secondary hemorrhage in connection with very serious growths, were confined to the 207 carcinomas and



Wound after separation of slough

Scar one and a half years later.

Fig. 5. Carcinomatous nodule the size of a marble in outer quadrant of breast. 1,000 milliamperes for ten minutes, under ether, after removal of a specimen.

the knife. Previous prolonged treatment by the Roentgen ray is also detrimental to a case from the point of view of its operability by ionization, as the radiation conceals the true limits of the

sarcomas, a computation on that basis would show the mortality to be 5.3 per cent.

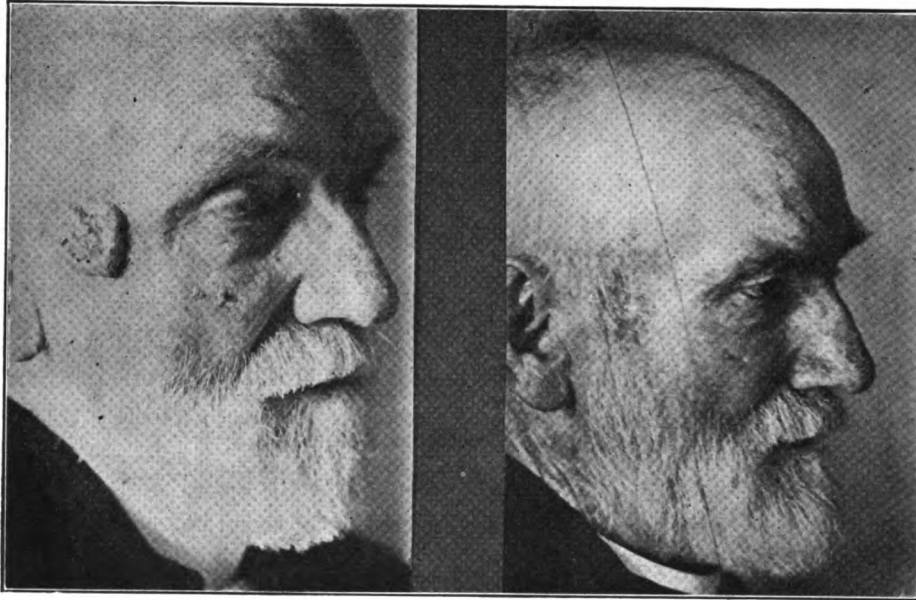
In Table C the 300 cases are classified as to location, irrespective of histologic diagnosis, a most

useful grouping for practical study, as one of the chief advantages of the method is its adaptability for the eradication of growths in certain confined localities, such as the nasal cavities, the mouth, rectum and axilla.

TABLE C.  
SUMMARY OF 300 CASES BY LOCALITY

	Cases	Cured	Deaths
Mammary Gland .....	67	20	2
Face .....	62	49	0
Mouth .....	48	14	4
Cervix Uteri .....	25	3	1
Rectum .....	20	9	2

mucous membranes, whether definitely malignant or merely in the suspicious condition called "precancerous" (though, strictly speaking, a cancer must be a cancer, even in its infancy). The unipolar method is exceedingly simple, bloodless, and almost painless, and by it any physician with a simple constant current office outfit may destroy in a few minutes any small, circumscribed epithelioma of the skin, eyelids, nose, mouth, rectum or vagina. The



Before treatment, July 26, 1909

After treatment, September 6, 1911

Fig. 6. Squamous cell epithelioma.

Neck .....	17	3	1
Lip .....	9	6	0
Ear .....	9	1	0
Eyelid .....	7	7	0
Maxilla .....	6	1	0
Skin .....	6	6	0
Orbit .....	5	0	1
Groin .....	4	0	0
Nose .....	4	4	0
Scalp .....	2	1	0
Hand .....	2	1	0
Axilla .....	2	1	0
Shoulder .....	1	1	0
Abdominal Wall .....	1	0	0
Penis .....	1	1	0
Urethra .....	1	1	0
Larynx .....	1	0	0
	300	129	11

The diagnoses under which the cases are classified were verified in every instance, copies of the reports of pathologists corroborating the diagnosis having been found with about three-fourths of the case histories, and are in my records for inspection.

#### CONCLUSIONS.

My observation of the results of the ionic method in these cases, whether of cure, amelioration or failure, convinces me that it is the preferable mode of attempting immediate eradication in the following conditions:

It is an ideal method of immediate eradication of any small, circumscribed growth of the skin or



Fig. 7. Scar one year after destruction of tubular carcinoma of breast the size of a golf ball in a patient aged 74. One ionic application of 1,000 milliamperes for fifty minutes under local anesthesia.

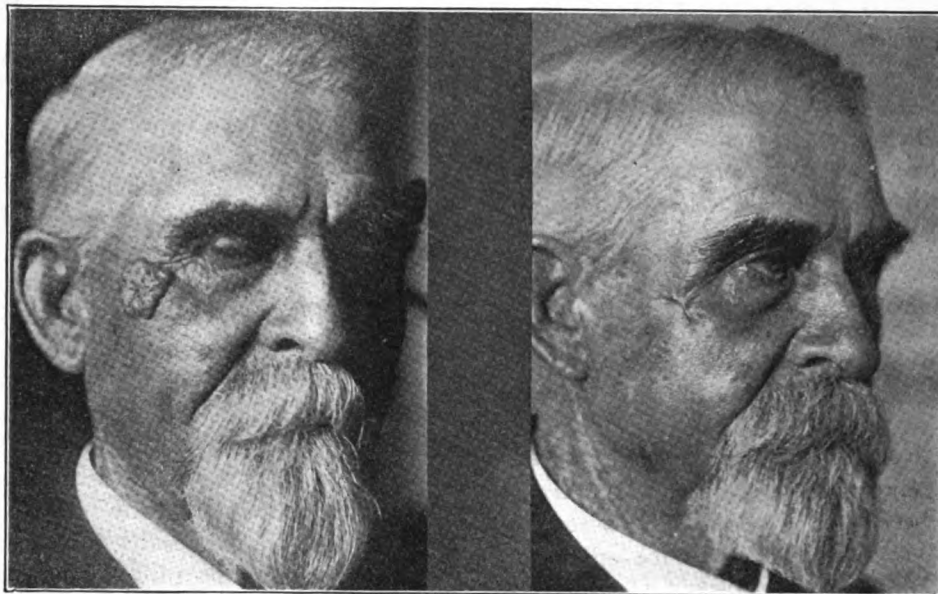
93.5 per cent. of cures that have stood the test of years without recurrence is significant.

An extension of its value in incipient cases, particularly the bipolar technique, is the possibility of

destroying by this method small carcinomas of an organ such as the tongue and breast without sacrificing the whole organ, in the rare cases in which our attention is called to them in this stage. The absolute sealing of the edges of the wound at the moment of devitalizing the small growth renders this method possibly the only one by which such an eradication may be successfully done without re-infecting the organ. The list contains several

tion the dead tissue is immediately placed outside the body biologically by the sealing of the absorbents. The patients present no rise of temperature during separation and there is no evidence whatever of absorption of toxins.

The contraindications to the method are mostly of a surgical nature, involving risk of secondary hemorrhage when large vessels lie too close to the growth; when local dissemination is too deep in



August 7, 1911

Fig. 8. Epithelioma of face.

July 6, 1912

cases in both of these organs that have remained free from recurrence from six to nine years.

The second group of cases in which the bipolar method has been found to be particularly valuable is made up of those carcinomas and sarcomas that on admission are just beyond the line of successful removal by the knife. The conditions attending ionic destruction precluding operative re-infection, the destruction may be carried deeper in growths that would necessarily be wounded in an effort at excision. This is particularly true of growths situated within cavities, which may be destroyed through the natural openings without mutilating overlying structures. In the axilla the skillful placing of the electrodes permits us to destroy the whole contents without removing the pectoral muscles.

The deaths recently reported following powerful radium treatment indicate by contrast one of the advantages of the ionic method in growths properly situated for its employment. While powerful application of radium may kill carcinoma *within the body*, with the dead tissue in intimate association with unclosed absorbents, the ionic method automatically removes its products from biologic association with the patient. After an ionic destruc-

tion recurrent cases for all parts to be reached effectively; in carcinomatosis or sarcomatosis of gland chains; in too extensive subsurface implantations, as *cancer en cuirasse*, etc. In these classes of cases the ionic method should not be used, except in some instances to remove the upper layers of a growth in preparation for intensive Roentgen ray application or for thermo-radiotherapy.

1823 WALLACE STREET.

#### FACTORS IN ABDOMINAL OPERATIONS.

Rough handling of the abdominal viscera and needless dragging or pulling upon the mesentery favor both post-operative tympanites and abdominal pain and discomfort. Gentleness in the separation of adhesions so far as possible along natural lines of cleavage will lessen the number of new adhesions that will form, and reduce the incidence of pulmonary and cerebral emboli.

Complete hemostasis should always be sought. Whenever important vessels are ligated, if they cannot be thoroughly isolated, a suture should be introduced which will include enough proximal tissue to prevent slipping.—RAYMOND WALLACE in the *Southern Medical Record*.

SUPRAPUBIC CESAREAN SECTION FOR  
PUERPERAL ECLAMPSIA.B. M. RICKETTS, M.D.,  
CINCINNATI, OHIO.

While deaths due to accident or disease during the pregnant state are perhaps the most deplorable, those due to eclampsia are more horrible and with a greater mortality, because two lives are concerned.

It is therefore no wonder that opinions concerning ways and means to overcome them should be at such variance. Not until a comparatively recent period in the history of dealing with eclampsia have care-takers had to offer other than therapeutic and dietetic measures, surely not surgical measures, except it be phlebotomy, the value of which has probably been underestimated, delivery per vaginam by various methods not being considered in cases after the sixth month.

The great number of deaths occurring annually due to this fulminant toxemia is sufficient within itself to excite suspicion that additional measures are necessary to overcome its ravages. It must be admitted, however, that those most interested in the subject are sorely at variance. But the squaring of the circle has been voted a possibility by a few who can locate the north star, describe the milky way, and estimate the courses and rate of speed of Halley's comet.

Enough evidence is offered in the accompanying reports and tables to change the existing angular thought to one more graceful and enduring. Though the hand of the juggler may cause the compass to vacillate for the time being, its point will eventually direct the proper course to be followed in caring for the eclamptic.

The destruction of a city of large proportions by quake and fire was necessary to overwhelm and convince the world that there is something other than the roar of cannon and the glistening of swords.

It required the loss of the newest and largest ship laden with the costliest cargo and the greatest number of human lives to change the laws governing the navigation of the high seas. It was recently necessary for five million people to be overwhelmed by the sudden inundation of their homes, two hundred thousand of which were totally destroyed, to prove the fallacy of human endeavor; and it will ever be thus.

Zinke states (*Journal of the A. M. A.*, July 26, 1913) that he has observed 30 cases of eclampsia resulting as follows: "Four mothers, 13.3 per cent., died; 15, or 50 per cent., of the children were lost." The still high maternal mortality, 13.3 per cent.,

and fetal mortality, 50 per cent., in his last 30 cases, he says, was due to the fact that two of the mothers were moribund when first seen by him; one remained in profound coma after the first, and another after the eleventh, convulsion. The third died of shock and hemorrhage following an *accouchement forcé* performed by the physician in charge of the case. The fourth died soon after the eleventh convulsion, and a comparatively easy vaginal hysterectomy performed without an anesthetic. It is not claimed that the above mode of procedure will be invariably successful; but Zinke's experience impels him to believe that in those cases in which it fails, very little could have been expected from surgical intervention. Certainly, in the presence of any condition, maternal or fetal, which makes the birth of a child *per viam naturalem* hazardous or impossible, abdominal or vaginal Cesarean section or deep cervical incisions, each depending on the period of gestation and other circumstances, is a justifiable operation. But in view of the evidence presented, it can only prove a serious error to maintain that an immediate interruption of gestation or termination of labor, by any surgical method in vogue, is the treatment *par excellence* in eclampsia. The good results obtained from strictly medical care in these cases far exceed the results accruing from all the surgical means proposed for relief from the disease.

Lutz (*Surg. Gyn. & Obst.*, p. 550, June, 1913) summarizes the following statistics of the Urban Lying-in Hospital from 1909 to 1912: 1 case of eclampsia in 107 deliveries; 24 per cent. of the eclampsia cases occurred during the puerperium; the maternal death rate was 6.7 per cent. as a whole, 9 per cent. during the puerperium and 5.9 per cent. before and during delivery. The fetal mortality was 32.7 per cent.; but, excluding the post-partum cases, this rose to 36 per cent. The customary treatment of inducing labor was followed, rather than making a vaginal Cesarean section.

The labors terminated three times spontaneously, 17 by forceps, 13 by version and extraction, 3 by perforation, and 1 by vaginal Cesarean section. Venesection, morphine, and chloral were freely used. The author advises immediate delivery in severe cases where the pulse is small and rapid, the urine scanty, and coma persists between attacks.

On August 4, 1913, St. Ann's Maternity Hospital, St. Louis, Mo., Dr. Percy H. Swahlen states that they have delivered from 96 to 117 per annum for five years with only three cases of eclampsia during that period, one coming on during labor, one

four hours after labor, and one near the time of expected labor.

#### ECLAMPSIA STATISTICS.

The great number of deaths occurring annually resulting from eclampsia in the United States should excite enthusiasm in devising ways to overcome its ravages. To show that this may be done the reports from various individuals and health officers of the larger cities have been assembled together with that of the United States Census Bureau.

There being no concerted action on the part of the states and territories to tabulate the deaths due to eclampsia, or any other cause, preclude the possibility of the United States Census Bureau making correct statistical reports. However, an attempt was made in 1908 to get the co-operation of the various health boards of the states to make them correct. It is interesting to know that there are many states that have absolutely refused to co-operate with the Census Bureau, and of the great difficulty it has had in securing the co-operation of those states within the census zone.

The Bureau cannot, therefore, give full detailed reports of diseases and their mortalities, though enough evidence has been secured from the more thickly populated states and cities to determine the approximate mortality of eclampsia, which is four to one hundred thousand population, or four thousand deaths annually in the United States. To the four thousand deaths of mothers may be added forty thousand deaths of children, making forty-four thousands deaths due to a disease that may be partially, if not completely, amenable to surgical, therapeutic, or hygienic measures, probably the three combined.

The Charity Service of Cook County, Illinois, reports: "We beg to state that during the past year we have had fifteen cases of puerperal eclampsia in this hospital, and of this number, seven have died."

Charity Hospital statistics of New Orleans, from June, 1908, to June, 1913, are as follows:

Parturition eclampsia, total, 33 cases; cured, 13; died, 20; 27 children cured; 6 died.

Pregnancy eclampsia, total, 7 cases; improved, 1; died, 6; 6 children cured; 1 died.

Puerperium eclampsia, total, 4 cases; 1 improved; 1, no record; 2, died; 3 children cured; 1, no record.

Total mothers, 44; 13, cured; 2, improved; 1, no record; 28, died; 36 children cured; 7, died; 1, no record. There was no Cesarean operations for eclampsia.

Munro Keer Glasgow Medical Hospital reports

for fifteen years a mortality of 47 per cent. in cases of eclampsia, without Cesarean operations.

Herman Trousa (Medical Society of London, vol. xxv, p. 224, 1902) reports 38 cases of convulsions not operated on with 20 deaths. The following are the ages most frequently occurring:

Ages 10-19, 263 cases.

Ages 20-29, 981 cases.

Ages 30-39, 700 cases.

Ages 40-49, 146 cases.

#### ETIOLOGY.

The very interesting history of this disease is ancient and available in the various indexes and too well known now to receive other than passing mention. It probably occurs as early and as constant with animals as with man, though many appear to have escaped, indicating that it may possibly be a condition due to the influences of civilization and domestication. However, man appears to be the only one for whom it has a predilection.

The egg-bearing animals and birds are the only members of the two sub-kingdoms vertebrata that are exempt from conditions simulating eclampsia and, so far as they are known, confined to the mammals.

#### CLIMATIC INFLUENCES.

The reports at hand from health officers and hospitals of the larger cities indicate that there is a higher per cent. of eclampsia and mortality in the Southern states, and that the per cent. of cases and mortality is greater in the black than in the white race, there being no evidence at hand concerning the red and yellow races.

Statistics pertaining to eclampsia, like those upon any other subject, are more or less imperfect, and will remain so until legal measures are complete to make them perfect, but there is no excuse for lessening our efforts.

The high mortality among the people of the Southern states is probably due to unknown climatic influences; but with the absence of any evidence that the peoples inhabiting the arctic regions have a lower mortality than those of the middle and temperate zones, this question must remain indefinitely undetermined. With the absence of any information pertaining to the season of the year in which this disease is most frequent, it might be reasonable to infer that its increased frequency and death rate in the Southern states indicate that it occurs more frequently during the summer months. This would be a logical conclusion if it is found to be less frequent and deadly in the arctic regions.

Eclampsia seldom occurs before the fifth month of gestation, but gradually increases in frequency,



## HEALTH OFFICER'S REPORT.

City.	1907.	1908.	1909.	1910.	1911.	1912.	1913.	Total.	Blank.
Cincinnati .....	1	8	5	6	8	8	.....	36	.....
Pittsburgh .....	.....	15	8	14	30	16	.....	83	.....
New Orleans .....	.....	.....	.....	21	30	.....	.....	51	30
Chicago .....	47	55	50	56	60	50	.....	318	.....
New York City .....	.....	127	160	138	143	161	.....	729	.....
Boston .....	.....	12	39	20	27	32	.....	130	.....
Baltimore .....	28	24	30	22	17	20	20	161	.....
Washington .....	.....	17	5	8	15	20	.....	68	.....
Cleveland .....	.....	6	11	18	12	13	.....	54	.....
Detroit .....	13	10	11	16	15	16	.....	81	.....
Providence .....	.....	13	8	16	20	10	.....	67	.....
Nashville .....	.....	6	3	3	8	5	.....	25	13
Indianapolis .....	.....	4	7	2	5	9	.....	27	.....
Thirteen cities, total for five years .....	.....	.....	.....	.....	.....	.....	18	30	.....
For the census zone only: U. S. ....	1,470	1,619	1,706	1,824	2,094	.....	.....	.....	.....

until full term of gestation, though it has been known to occur before the third month.

May not the exciting cause be found in the bite of an insect, the presence of a parasite entering the body by way of the mouth, anus, uterine cervical canal, or urethra, or through the cutaneous structures?

If it is more frequent during the summer months or in a latitude where there are a greater number of warm months, would it not indicate the danger of insects or parasites, which are more numerous then?

What relation does the so-called eclamptic state in the female have to the so-called uremic conditions in the male?

The presence of albumin in the urine of the pregnant woman is not conclusive that eclampsia will occur with or without one or more convulsions, especially just before, during or after delivery, or before, at, or after full gestation, because convulsions do not always occur when albumin is present to any degree; indeed, eclampsia exists without convulsions or the presence of albumin. It may, however, occur after convulsions or delivery. It cannot then be considered a cause, but it may indicate the absence of an important substance, probably urea, that should be present in the urine in considerable porportion, but which remains in the general circulatory system, both arterial and lymphatic, as the result of acute nephritis varying in degree. Though there does not appear to be any evidence indicating that even a large amount of urea is essential to produce the required toxicity, small amounts being physiologic.

This would indicate that the amount of dosage varies with the individuals, and with the general condition of the individual at a time when the toxic irritation to the central nervous system is produced, if urea be the cause. But this remains undetermined. A certain unknown fulminant toxemia is ascribed as being a cause.

Would the subjects of eclampsia having nephritis before conception have convulsions, so early in life, if they have never conceived? What rôle, if any, does an inhabited uterus play in the tragedy of

convulsions? If the presence of a living or dead body within the uterus is the exciting cause, why do not convulsions always occur with such an inhabitant?

If the exciting cause exists within the mother and not within her uterus, why does not the living occupant of the body always have convulsions? Perhaps it does. It often has after birth. Its blood is identically the same in character as that of the mother, containing the same proportion of albumin and urea, which are supposed to have been the bane of the pregnant state. Is it the poison or the condition that produces the poison that causes the convulsion?

The presence of albumin may be due to neoplasm, urea, hysteria, epilepsy, cerebral irritation, diet, cardiac or hepatic disturbances. It is therefore important to differentiate them, though the same doubt prevails with their absence or presence.

If nephritis is due to the presence of gestation, and the two are the cause of eclampsia, should not gestation be terminated immediately? Should it not be terminated abruptly if the presence of the fetus alone has anything whatever to do with causing convulsions?

Surely, the presence of one dead within the uterus would not be tolerated longer than the time necessary to remove it, in the shortest time, and with the greatest safety to the mother. If necessary when dead it is more necessary when alive, because of the possibility of saving two lives.

The many theories pertaining to the reflex disturbances offer no solution to this all-important problem.

Gestation must be terminated by natural or artificial means soon after maturity (280 days), though the legal time has been extended to 320 days, with safety to the mother and the birth of a healthy, living child. This variation in time of gestation is mentioned to refute the statements that 280 days is the legal time, but these are not exceptions in favor of delay in delivery at any period of gestation when convulsions occur. The period of gestation varies with all animals and with the individuals of every particular kind.



In the absence of any knowledge of the unborn child having eclampsia simultaneous with the mother, would not investigation to prove or disprove their existence be important?

The child may be seized with convulsions before or after delivery, and die at once or survive for several hours, as the result of toxins closely associated with uremia.

Antibodies have been suggested as the sole important cause of eclampsia; but, if they are, they have never been discovered.

#### CELIOHYSTERECTOMY (PORRO)

1. Extraperitoneal stump.

2. Intraperitoneal stump.

*Celi hysterectomy* (Porro) implies the removal of the uterus with or without its cervical portion in the usual way, and, when applied to Cesarean section, removal of the uterus containing gestation at any period, with or without its cervical portion.

*The necessity for removing a pregnant uterus* arises when fibroids or infection are in evidence, and when the child has been dead for a number of hours. It cannot be said that any form of hysterectomy should be done when the uterus is abnormal, or the pelvis is deformed for the purpose of preventing conception because the removal of the tubes alone will overcome that. To these may be added the ovaries in a limited number of cases when menstruation is to be prevented, but the ovaries should, when possible, remain undisturbed, because a normal is easier than an artificial menopause.

*Extraperitoneal stump*, fixing the stump permanently in the abdominal wall, was formerly given preference. This method antedates the intraperitoneal stump method, and should continue to be the method of choice in infected cases and rupture of the uterus.

Infection is the most serious of the uncontrollable complications of pregnancy that is to be reckoned with surgically, because of the high maternal mortality, with or without operation. For this reason a great number of operators refuse absolutely, and many hesitate, to render surgical assistance. Infection in the great majority of cases is primary to the operation; and the mortality is very high, while it is very low with infection secondary to the operation.

Detection of secondary infection, especially its type, before operation, is not always possible, but if it were the course of procedure should not be changed.

A dead child should, as a rule, demand this method of procedure, especially if it be dead for any great number of hours, because of the difficulty in determining the presence of infection or the state of decay in the child.

Uterine rupture, while not frequent, occurs often enough to be considered at all times; and when present there should be no question as to the adoption of the extraperitoneal method.

The intraperitoneal method implies severing the body of the uterus from its cervical portion that the latter may be covered with peritoneum, and the abdominal wall closed immediately. This is the method of choice in cases of uterine neoplasms and anomalies, multiple pregnancies after the sixth month, and intra-abdominal neoplasms involving the uterus without infection.

#### INDICATIONS.

1. Neoplasms of the uterus.

2. Intra-abdominal neoplasms.

3. Anomalies of the uterus.

4. Multiple pregnancy after the sixth month.

Uterine neoplasms vary in size, location, and number, and for this reason abdominal section should be done to determine the condition within that cavity, the course of pursuit to be determined when the abdomen is open.

Intra-abdominal neoplasm, such as ovarian, mesenteric, retroperitoneal, and intestinal cysts and solid growth of any character are frequently associated with eclampsia to such a degree that the removal of the uterus is necessary by one of these two methods.

Anomalies of uterus are of many kinds, and often require hysterectomy by one of these two methods when eclampsia is present or absent.

Multiple pregnancy after the sixth month may be within the uterus alone, or within and without the uterus simultaneously, and when associated with eclampsia may probably necessitate hysterectomy by one of the two methods herein suggested.

#### SURGERY

1. Intraperitoneal.

2. Extraperitoneal.

The purpose of assembling universal conclusions is to discover one composite which will direct a certain procedure, surgical or non-surgical, that will lessen, if not altogether eliminate, mortality.

The object of this work is, therefore, to supply data pertaining to eclampsia treated by suprapubic Cesarean section other than the lateral method.

The most exhaustive work of Dr. Ruben Peterson, of Ann Arbor, on "Vaginal Cesarean Section," is sufficient within itself to make it necessary to give that subject consideration.

*Surgical.* The number of surgical aspects of puerperal eclampsia increases with knowledge of conditions and surgical technic. That the trend of

relief is in the direction of immediate artificial evacuation of the uterus is self-evident, and that many cases may go to normal delivery with safety to both mother and child, there can be no question. But how to classify the two will probably remain in doubt. Until that doubt is eliminated ways and means must be considered that will offer the greatest safety to both mother and child. It would therefore appear from the foregoing statements that the most rational method is offered in celiohysterectomy done by one of the various methods generally advocated.

*Ambulancing.* Desperate symptoms demand desperate means of relief regardless of environment. One who is drowning cares not whether he is favored with a straw or a pack of corks so long as it is the best that can be had to save his life. A surgeon should not hesitate to demand that a Cesarean section be made before manipulation of any kind is resorted to. Then, and not until then, will cases in the hands of certain practitioners have their best interests conserved. Time spent in dilating, or attempting to dilate, the cervix is wasted, and adds to dangers; such as infection, trauma, and hemorrhage incident to delay. It is to be lamented that the death of the child is given so little consideration, many operators having not made any report pertaining to its mortality.

Suprapubic Cesarean section is performed by two methods and their variations, namely (1), intraperitoneal and extraperitoneal.

Intraperitoneal, the time-honored method, remains the one of choice, and should be given preference in the greater variety of conditions demanding the immediate evacuation of the pregnant uterus after the sixth month. The transverse incision for abdominal Cesarean section was made in 1797 in Germany, but was little known until Fenestiel made it popular.

Dr. J. L. Forwood has done forty-two intraperitoneal sections for all causes in ten years. He formerly lifted the uterus out of the abdominal cavity before incising it; but he now incises it, and delivers without doing so, the hands of an assistant being utilized for grasping the lower segment of the uterus to control hemorrhage. He does not cut low down in the lower segment.

#### EXTRAPERITONEAL CESAREAN SECTION.

1. Lateral.
2. Median.

The lateral method has been done for many years, but has fallen into disrepute because of the very high mortality attending its doing.

The median method is of more recent origin, and

bids fair to grow in popularity in properly selected cases.

Dr. Barton Hirst, who is partial to this method and has done nine of the ten thus performed, describes it as follows:

"An incision large enough to permit the extraction of the child's head is made below the umbilicus. After making the incisions in the two layers of the peritoneum they are sutured together, which immediately closes the peritoneal cavity, making the operation extraperitoneal. Then follows the incision in the uterine wall, made in the ordinary way, and the extraction of the child's head with forceps. The lower uterine segment is sutured with double catgut; and the abdominal wall is closed in the usual way. It has been found to increase hemorrhage if the placenta is delivered from the uterine wound. It is rather better to clip the cord off, drop it into the uterus, suture the uterus, and deliver as usual. If the woman is not in labor, it is necessary to extract the placenta through the uterine wound.

Dr. John B. Deaver inclines to this method, though he believes the danger to the child to be greater.

Dr. Wm. R. Nicholson, who has witnessed six operations performed by this method, advocates it in selected cases without infection, while Dr. E. E. Montgomery states that there is no great demand for the extraperitoneal operation in the absence of infection.

Dr. E. P. Davis welcomes most heartily a method through a peritoneal fistula, though he would not employ it in the presence of hemorrhage or infection or where infection is suspected. In our experience Cesarean section is indicated in eclampsia in not more than 20 per cent. of cases. It should, however, be promptly performed if improvement does not otherwise follow.

#### INDICATIONS FOR CELIOHYSTERECTOMY.

After sixth month when associated with eclampsia.

In the order of their supposed frequency.

Any other condition or circumstance that would cause delay in prompt and rapid delivery.

An undilated cervix is a serious factor because of the want of uterine effort and the great danger through time necessary to dilate and deliver.

Deformed pelvis is *prima facie* evidence that the abdominal route should be selected.

A large fetal head is an indication that delivery through the abdomen should be resorted to, that the best interest of both child and mother may be conserved. This is done by shortening the time nec-

essary for delivery, and avoiding a great amount of trauma incident to the route per vaginam.

A dead child (recently dead) should probably be removed suprapubically, oftener during the eclamptic stage than one that has been known to be dead for several days, because the dangers of infection are not so great with the first, while with the second it may be removed sectionally more rapidly per vaginam, and probably with no greater risk of infection.

Absence of labor pains, associated with eclampsia, demands careful consideration, especially at full term, without dilation of the os. Uterine contraction cannot be hoped for under such circumstances after delivery by any method.

Malposition of the child adds to the amount of time necessary to delivery, and must add to the danger to the life of both mother and child.

Neoplasms (intra-abdominal) are quite commonly present with the pregnant uterus at the time of eclampsia. Such complications are of many varieties, and, as a rule, demand celiohysterectomy, that the greatest safety may be given to both the mother and child.

Elongated cervix, so frequently found in primiparae, is a serious handicap when delivery is attempted per vaginam, especially when eclampsia is complicated with hemorrhages, even though the os be dilated.

Uterine hemorrhage, when uncontrollable, due to any cause, should be an indication for delivery suprapubically, especially if the loss of blood is sufficient to endanger life, because the further loss of blood to any considerable amount may be absolutely prevented.

Placenta previa, though rarely complicating eclampsia, is probably the most serious, because of hemorrhage, the danger of infection, and the jeopardy in which the life of the mother and child are placed.

Cervical neoplasms, malignant or benign, like scar-tissue, resulting from injury, disease, or surgical operation, especially amputation of the cervix, may be sufficient to prevent dilatation without the use of instruments.

Vaginal neoplasms of any character, or cysts, may, owing to their size, prevent or interfere with rapid delivery, and such pathology involving the rectum or coccyx, like their deformities, may also be troublesome.

Malformed vagina, such as may be congenital or acquired by injury or disease or surgical repair, is not infrequently encountered in delivery.

Deformed uterus may be congenital, or acquired

by injury, disease, or surgical operation, and when found to exist is a sufficient cause for resorting to the suprapubic route.

Rupture or perforation of the uterus absolutely demands abdominal section.

Labial hernia, though of rare occurrence, is a possibility, and when present is to be reckoned with as a serious condition, demanding the suprapubic operation.

Infection is the most serious regarding mortality, doubt always existing as to the propriety of doing any kind of an operation whatever for the extraction of the child in the absence of eclampsia; but, when eclampsia exists, there should be no hesitation about emptying the uterus in the quickest possible manner, because the child, if dead, must not remain, though the mother may be reckoned fatally ill. If the child be alive and of seven, eight, or nine months gestation, it may survive though the mother does not recover. It would be criminal to permit the mother to die undelivered of a dead or a live child by some one of the recognized methods, one which would insure her the greatest safety so long as man is not infallible.

If the mother is moribund or convulsions are frequent or severe, the child should be saved by any means, rapid delivery offering the greatest safety. Dührssen says operate after the first convulsion.

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(To be continued.)

#### SEMINAL VESICLE INFECTION.

So far as we have gone, we can say that:

1. Vesiculitis may occur from infection with tubercle bacillus.
2. When one vessel is involved its fellow may also be safely accused.
3. Radiograms with collargol seem already to demonstrate the presence of inflammatory changes, and their future as a diagnostic aid seems bright.
4. Dense adhesions, usually surrounding the junction of vas and vesicle, not only make operation difficult, but in most cases would make successful separation of the two structures impossible.—J. D. BARNEY in the *Boston Medical and Surgical Journal*.

## THE TRANSFIXION TREATMENT OF FEMUR FRACTURES.\*

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Some fractures of the shaft and ends of the femur are very hard to manage when the fragments are much mal-aligned by overlapping, lateral and other displacements. In these, the ordinary methods of extension by Buck's or other apparatus frequently prove ineffective and in others the nature of the injury or the condition of the patient prevents the use of such contrivances.

At best these usual methods of treatment are not uniformly successful and often considerable shortening, angulation and other deformity persists, together with more or less stiffness of the knee and hip joints. Recognition of these unfavorable results has popularized the operative or open treatment of these cases by plating, wiring, bone transplantation and other procedures. However, these operative measures are of a major type and require a high grade of technical skill and are not uniformly successful either as to the immediate or final results. A cardinal objection is that the operative work is done in an already traumatized area which is still further irritated by the introduction of foreign bodies represented by wire, or plate and screws. Manifestly this form of treatment can never come into general use and it is now quite properly limited to selected cases under the direction of experienced operators. Between the extremes of non-operative and operative methods are devices of various sorts which are introduced at a distance from the fracture site, inasmuch as these do not invade a territory already sufficiently damaged by the initial trauma and do not require such advanced operative skill. These appliances take the form of metal pins driven into the fragments to be later separated or otherwise acted upon by braces or clamps, as in Parkhill's, Freeman's and other devices. Other modifications of this general type have from time to time appeared, all seeking the essential element of correcting vertical or lateral displacement. Various sorts of hooks and tongs have also been employed with the same ends in view. For fracture of the extremities, transfixion of the os calcis by a metal pin or rod was first suggested by Codivilla of Bologna in 1903, but Steinman of Berne in 1907 suggested transfixing nearer the lower fractured fragment by a nail and focused attention so forcibly that the title "Steinman's Nail Extension" is now quite generally ap-

plied to this method of treatment. The essential aim of the method is to obtain traction by driving a metal pin, nail or drill through the skin, soft parts and bone of the distal fragment, allowing enough of the metal to protrude on either side of the skin so that traction cords may be fastened to its side and thus lead to a pulley and weights or springs at the foot of the bed. By this means a direct measurable pull is obtained so that the fragments are gradually dragged into position by overcoming the muscular resistance. No apparatus except that attached to the transfixer is ordinarily required, aided by some form of inclined plane to keep the knee semi-flexed during the succeeding weeks of transfixion.

A variety of transfixers have been devised, some of them in two pieces, each half being separately introduced on either side of the limb; others are inserted after a preliminary hole has been made. My experience has been wholly with an ordinary steel bit or drill such as is used for boring holes in wood or metal, and this is allowed to remain in place until it has served its purpose. An ordinary "brace" has been used for boring the hole, but an electrically driven apparatus, of course, will act as well if it is not revolved too swiftly.

### INDICATIONS FOR FEMUR TRANSFIXION.

1. Fractures in which ordinary methods are inapplicable or inefficient. These are usually very oblique, spiral or transverse fractures showing considerable deformity from displaced fragments in which traction on the soft parts alone is likely to prove inadequate.
2. Compound, comminuted or complicated fractures in which the parts at or near the fracture site itself cannot be interfered with.
3. Restless, delirious or otherwise uncontrollable patients; also the aged or infirm in whom decubitus might prove dangerous.
4. Old fractures showing non-union or vicious union in which recorection is made preliminary to transfixion.
5. Certain fracture-dislocations, or multiple fractures.
6. To obtain preliminary alignment prior to plating or other operative procedures.

### TIME OF APPLICATION.

As soon as the diagnosis is established the treatment may begin. Preliminary measurements should always be made, and when possible radiographs should be taken in the antero-postero and lateral axes. It is not necessary to wait until swelling or other reaction subsides, and the presence of the

\* Read before the New York and New England Association of Railway Surgeons, October, 1913.

usual effusion of the knee joint offers no contra-indication.

#### METHOD OF APPLICATION.

The *length* of the transfixer is such that one inch or more protrudes on either side so that the traction cords may have ample room for attachment. If desired, a metallic crossbar shaped like ice tongs may be used to span the space between the transfixer, the cords being attached to either free end.

The *diameter* of the transfixer is three-sixteenths of an inch or less for a child, and five-sixteenths of an inch or more for an adult.

The *Drills* used by me are known to the hardware trade as "high speed twist drills," although commercial "twist drills" will answer for ordinary cases. I have used "auger bits" and other transfixers with short cutting surfaces, but these clog and bind and do not so readily transfix the tissues because of a limited clearance space. I am having special vanadium drills made so that there will be no chance of breakage.

The *Brace* should be short and strong and I have found the ordinary "Yankee" type very satisfactory for this and other bone work.

#### TECHNIC.

The patient is anesthetized and the shaved limb is painted with tincture of iodine and the knee is partly flexed on a sand-bag and held by an assistant. The condyles of the femur are located, or if obscured by thick tissue or swelling they can be identified by recalling that the upper border of the patella and the condyles are practically in the same line when the knee is flexed at a right angle. The transfixion is made two or more inches directly above the level of the condyles so that the joint and epiphyseal line may not be damaged. Great care must be taken to avoid the popliteal and synovial pouch regions. At the selected point above the external condyle, a semi-circular one-half inch incision (concavity downward) is made down to the fascial level. A director is now inserted to the bone and firmly held there by an assistant, and along this as a guide the drill is passed. The soft parts may be protected somewhat by spreading them away from the drill with a long bladed car or other speculum used as a retractor. The assistant steadies the limb by firm pressure and guides the direction of the drill so that it passes directly at a right angle to the axis of the bone. When it has penetrated the soft parts and bone, it is made to impinge against the skin on the inner side of the limb and then is pushed through a half inch semi-circular incision identical with that of the opposite side. There is usually very little bleeding. The

wounds are touched with iodine and the drill ends are thrust through a few layers of gauze padding and the wounds thus covered. A few straps of adhesive or a bandage completes the dressing. The procedure requires about ten minutes and in selected cases can probably be performed under local anesthesia, with the patient in bed.

After the patient is in bed the limb is placed on raised pillows or any form of padded double inclined plane reaching from the heel to the buttock, the knee being at an angle of about 120°. The foot of the bed is elevated eight or more inches and then cords are attached to each end of the protruding drill and brought together at a "Spreader" and thence one cord leads to a pulley at the foot of the bed and thus to the dangling weight. For children, a weight of eight pounds is enough for the first day, and within a week it should be increased gradually up to fifteen or more pounds. With an adult, the weight is doubled. In the children I have treated (eight cases) the maximum weight has been fifteen pounds; in adults (three cases), thirty-six pounds. Restless patients may require some lateral guy weights to keep the limb straight, but I have found elevation of the foot of the bed a good form of counter-traction, and side pulls thus far not often necessary. For the first few days a good deal of pain may be expected, but thereafter the patients are remarkably comfortable, considering what is apparently a very cruel process not unlike crucifixion. The patients have considerable lateral motion and can sit almost bolt upright in bed and the problem of nursing care is thus lessened.

Weight traction is usually effective after two weeks and this can be verified by measurement or radiography. If deformity has been overcome the drill may be extracted and then a plaster of Paris spica is applied and this is worn four or more weeks until union is sufficiently firm to allow the patient out of bed. In selected or otherwise controllable cases it is preferable to continue the traction with a lessened weight for four weeks or more, and then the drill is removed. No great pain occurs when the drill is extracted as it usually is quite loose in the bone although tightly gripped by soft-part granulations which bleed slightly when the metal is withdrawn. Massage can begin after the first week and some passive motion of the knee can be given at the third week. Joint motion, however, will be found well preserved because of the lack of complete immobilization.

After union is firm, treatment is the same as under any other form of management. In some frac-

tures very close to the knee joint as in the supra-condyloid variety, transfixion can be made through the head of the tibia, and indeed this site is advised by some as the place of election in fractures of any portion of the shaft of the femur. It has not appealed to me because of the tension imposed on the undamaged knee joint, although this appears to be a theoretical more than practical objection.

Fracture of the neck of the femur has also been treated by transfixion, and the cases suitable for the position of abduction should be very readily controlled by the procedure as the direction of the traction-pull is easily arranged.

#### OBJECTIONS.

1. *The bone is not completely immobilized.* This is not a real defect, as union will be firmer and quicker than if the parts were in absolute fixation.

2. *Necrosis may be induced by the drill.* This has not been caused in the cases thus far reported and the radiographs indicate no osteoporosis or other bone changes. The fact that the drill is so easily extracted would seem to indicate that the bone sought to expel the drill by erecting a barrier of osseous granulation, in effect regarding it as a foreign body.

3. *Infection is carried from without in.* This sometimes occurs in any operation, but there is nothing inherently dangerous in this technic.

4. *Lateral deformity is uncorrected.* This in a measure is true; but apparently it is not an essential element, for if the over-riding is effected the functional result will be good. Lateral traction and vertical suspension surcingles may in part correct this.

#### ADVANTAGES.

It is an intermediate measure between the closed or non-operative methods (Buck's Extension and the like) and the open or operative radical methods (plating or wiring). It is less hazardous and perhaps more generally applicable than plating because the procedure is (a) simple; (b) the scene of operation is at a distance from the traumatized area; (c) no foreign body is left in the tissues; (d) the parts are always exposed during healing; (e) joint stiffness is minimized; (f) atrophy, joint-stiffness and decubitus can be controlled.

It is by no means adapted to all sorts of cases and is not recommended where ordinary forms of extension suffice, nor when plating or transplanting seem more likely to be efficacious either because of the nature of the injury or the availability of a surgeon skilled in that work. It is a simple operative procedure readily performed by the average sur-

geon with a minimum of risk and paraphernalia and it can be done at the patient's home if necessary.

The transfixion feature may well be used preliminary to plating, thus obviating much of the trauma occasioned by efforts to align fragments more or less separated by contracted powerful muscles.

Sufficient time has not elapsed to learn the ultimate effect in the cases herewith reported; but thus far the results promise well and certainly the relief from shortening and other deformity is such that the method should find a place in the treatment of many fractures of the type already mentioned.

The following representative cases are reported showing radiographically the results of the transfixion and they are selected from a group of eleven cases treated since July, 1913, when the writer first began this procedure.

The cases cited from Harlem Hospital were in the service of Drs. John J. McGrath and Irving S. Haynes respectively, and the case treated at the Post-Graduate Hospital was in the service of Dr. John F. Erdman, and to these visiting surgeons I am indebted for the opportunity of treating these patients. The radiograms from Harlem Hospital were made from plates taken by Dr. W. H. Stewart. Dr. I. Hirsch made the plates in the case reported from the Post-Graduate Hospital.

Case I. John S., aged 11, was admitted to Harlem Hospital June 30, 1913, with a compound fracture of the middle of the femur due to being run over by a wagon. Transfixion was done July 3rd, and the drill was removed July 29th and at that time union was fairly firm and there was a lengthening of one-quarter of an inch. A plaster of Paris spica was worn for two weeks thereafter and it was then removed and he was sent to the country for the summer. I am told by our social service department that he has a normal-looking and acting extremity.

Case II. John H., aged 6, was admitted to Harlem Hospital July 7, 1913, with a simple fracture of the upper third of the femur and humerus due to being run over by an ice wagon. He was transfixion July 10th and the drill was removed July 29th and then a plaster of Paris spica was applied as in the preceding case, the injured thigh then showing no shortening. He was presented before the Harlem Hospital Clinical Society in October and his recovery was apparently perfect.

Case III. Peter D., aged 7, was admitted to the Post-Graduate Hospital July 5, 1913, with a fracture of the upper third of the femur due to a fall from a stoop. Transfixion was done July 11, and the drill was removed three weeks later and plaster of Paris applied as in the preceding cases. There was then about one-fourth of an inch lengthening. He has had an excellent anatomical and functional result. There is little if any inflammatory reaction about the holes made by drilling.



Case IV. D. S., aged 31, was admitted to Harlem Hospital Sept. 12, 1913, with a fracture of the lower third of the femur due to being knocked down by falling earth. There was a shortening of nearly two inches and the patient was exceedingly muscular and of heavy build, and the region about the fracture and knee was greatly swollen. Transfixion was done September 18 and the drill was removed October 26 and at that time there was one-half inch lengthening with a fairly large soft callus and some antero-internal bowing. A plaster of Paris cuff was then applied extending from the groin to below the knee and this will be removed about November 18. I feel quite confident that transfixion was the treatment of choice in this case, because the swelling was so great that other forms of extension would have been inapplicable, and open operation exceedingly difficult if not hazardous.

Case V. Wm. Y., aged 7, was admitted to Harlem Hospital Aug. 15, 1913, with a fracture of the middle of the thigh due to falling from and being run over by a wagon. There was a shortening of one and one-half inches and he was in a Buck's extension apparatus until September 25, when transfixion was undertaken because there was little decrease of deformity. The callus at that time was fairly soft and under anesthesia an attempt was made to break it up and a weight of fifteen pounds was then applied to the transfixer. This proved ineffective and on October 13 the fracture was exposed by an anterior incision and a long spicule of partly ossified bone was chiseled through and then traction on the drill readily overcame the shortening. The drill was removed October 27 and shortening of three-eighths of an inch then existed. This case indicates the value of transfixion after another method of treatment proved unavailing.

Case VI. R., aged 8, was admitted to Harlem Hospital July 5th with a comminuted fracture of the middle of the femur, due to being run over by a wagon. Before operation there was a shortening of about one and one-half inches and the radiogram showed a fragment of bone considerably displaced. Transfixion was done July 10 and the drill was removed July 30. At that time there was a lengthening of one-quarter inch and the limb was placed in plaster as in the preceding cases.

#### EMPHYEMA THORACIS.

To discriminate between a purulent and serous fluid is often impossible, though there are many signs which favor the presence of pus rather than serum. It is frequently thought that a hectic temperature is indicative of pus, but I find as high temperatures recorded in my serous as in my purulent cases. When an effusion occurs in a child under three, the probability is strongly in favor of its being purulent, as also when it occurs subsequent to an attack of pneumonia, scarlet fever, or other infectious disease.—H. G. M. DUNLOP in the *Edinburgh Medical Journal*.

## LOCAL ANESTHESIA AS EMPLOYED IN THE BIER CLINIC IN BERLIN.

RALPH E. KLECKNER, M.D.,  
MATTOON, ILL.

The greater attention recently devoted to the subject of anesthesia, and the greater knowledge of the subject, have revealed dangers that were before unknown, and have shown how very much the ultimate well-being of the patient depends upon the careful selection of the method of anesthesia used. It is quite obvious that some of the remote dangers of some anesthetic drugs are far greater than the immediate; and it does not seem improbable that these sequelae may be more serious and far-reaching than we even now realize. As the dangers of general anesthesia in certain cases have been more fully appreciated, more attention has been devoted to local anesthesia; so much so that if the condition of the patient is such that the administration of a general anesthetic is likely to be especially dangerous, almost any operation of necessity can be performed under some form of local anesthesia.

Until comparatively recent years local anesthesia was very little used on account of the toxicity of cocaine, the agent usually employed. But with the introduction of the comparatively innocuous substance novocaine, considerable attention has been devoted to the subject and great strides have been made in the technics of this form of anesthesia.

Local anesthesia, excluding spinal anesthesia, may be placed under two heads: (1) Local Infiltration Anesthesia. In this case a very weak solution of the anesthetic drug is employed and the whole area to be operated upon is infiltrated with the solution. (2) Regional Anesthesia. A stronger solution of the anesthetic drug is employed, and a small quantity is introduced around the nerve trunks, or a weak solution injected into the veins that supply the part to be operated upon.

I shall merely enumerate most of the operative procedures in which local anesthesia is indicated, and attempt to describe the general technic of Infiltration, Venous and Plexus Anesthesia.

Among the operations that may be successfully performed under infiltration anesthesia are:

Gastrostomy and colostomy (the reason local anesthesia is indicated in these operations is that the patients that require them are usually in a poor condition to take a general anesthetic); the removal of all tumors of the skin, all tumors of the skin and fascia, all tumors of the flat bones, as of the skull;

all forms of hernia, if not incarcerated, or, if there are not extensive adhesions between the hernial contents and sac; appendectomy, *if performed in the interval* (when the tissues are not inflamed). But an operation for acute (inflamed) appendicitis should never be attempted under local anesthesia, for the reason that the necessary pulling and stretching of the peritoneum is extremely painful, and it is, of course, impossible to anesthetize this structure. The peritoneum can, however, be incised or burnt without causing pain. All operations upon the mammary gland, including amputation (but it is especially indicated in the extirpation of small tumors of the gland). All operations upon the

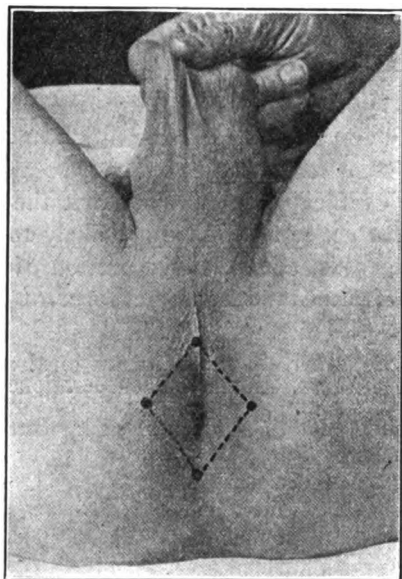


Fig. 1. Injection of the anus and rectum.

anus, penis, scrotum, and external female genitalia. For incision of abscesses, puncture of pleural exudates, rib resection, and dressing of all wounds. All operations upon the head and neck. All operations upon the extremities. In all the above operations, except those upon the extremities, infiltration anesthesia is usually employed.

#### INFILTRATION ANESTHESIA.

The anesthesia is produced by the injection of a one-half per cent. solution of novocaine and suprarenalin, except in operations upon the fingers and toes. Here a one-half per cent. novocaine solution, without suprarenalin, is used, with a constricting rubber band to retain the anesthetic fluid in the part.

The general technic of infiltration anesthesia is as follows: Four or more points surrounding the area which is to be anesthetized are injected by placing the point of the needle between the layers of the skin and forcing out the solution until a small

blanched spot appears. These points must be connected by an injection which is made into the skin forming a wheal, which must completely surround the area, as otherwise the injection is without value. Anesthesia is produced by bringing the solution into direct contact with the nerve endings. If no wheal is produced it means that the solution has been injected into the subcutaneous tissues and has not come in contact with the nerve endings. To produce this wheal successfully, one must use a long needle and push it forward between the layers of skin and inject the solution as the point of the needle moves forward. This continuous injection does two things: (1) It avoids putting

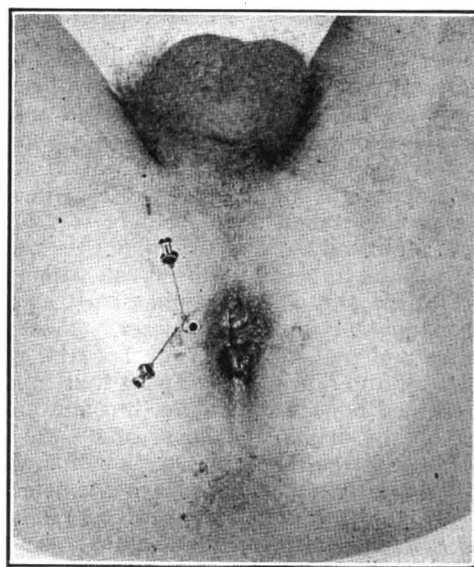


Fig. 2. Needle positions for the injections around the rectum.

much of the solution into a bloodvessel, should one be punctured. (2) The needle always passes through tissue that has been filled with fluid. The next step is to anesthetize the subcutaneous tissues. This is accomplished by the use of a long needle introduced at the same points that were used in the skin anesthesia. The method of procedure is exactly the same, *i. e.*, the solution is injected as the point of the needle moves forward for the same reasons as given above, except at a lower level. If deeper anesthesia is required, as in the removal of atheroma of the fascia or periosteum, the same rule is followed except at a deeper level.

This technic applies Hackenbruch's principle, *i. e.*, the nerves supplying a part come from all sides at the same level as the part supplied.

Following is an example of the technic of the anesthesia for hemorrhoid operations. The anesthetic used in this, as in most operations, is a one-half per cent. solution of novocaine and supra-

renalin. This solution may be prepared after the following formula:

Novocaine	0.25
Physiological Salt Solution	50.0
Suprarenalin Solution 1 to 1000	5 drops

This is Dr. Braun's solution No. 2. The prepared tablets may be procured in the market.

The typical surrounding injection (Fig. 1), as followed by Reclus, is executed in the following way: Surrounding the anus, four insertion points are to be marked about two or three finger-breadths from the anal orifice. From these a one-half per cent. novocaine-suprarenalin solution is injected by means of a hollow needle 10 cm. long. Beginning

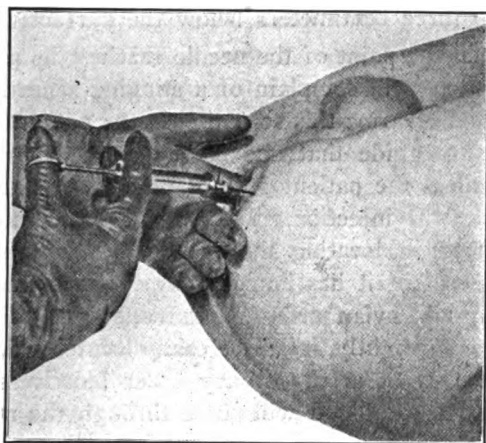


Fig. 3. Injection under the guidance of the finger.

at one of the side points, one pushes the needle first perpendicularly down parallel to the rectum, through the sphincter, and levator ani muscle. The needle is then withdrawn and reinserted its whole length in the direction of the front and back circumference of the rectum. In Fig. 2 the three needle positions are correctly illustrated. At each induction of the needle at least 5 cc. of a one-half per cent. novocaine-suprarenalin solution is emptied out in a continuous injection, and the same process is gone through from the remaining three points, so that at least 60 cc. of the solution is used for this purpose. This is followed by the surrounding injection, from one point to the other, at three different levels—once into the sphincter, once subcutaneously, and once into the skin. For this purpose an additional 40 cc. of the solution is used, making the total at least 100 cc. In very fat subjects 125 cc. should be used. It is possible to execute these injections without the finger in the rectum, but to the unpracticed it is better to control the point of the needle under the guidance of the finger in the rectum (Fig. 3), and one must feel its point above the sphincter and beneath the wall of the rectum.

In women, the anterior injection may be controlled from the vagina. If, on account of great pain, as in anal fissures, it is impossible to introduce the finger, the advice of Reclus may be followed, viz., to first make the mucous membrane analgesic by putting in a cotton tampon soaked in a two per cent. alypin-suprarenalin solution. The practiced surgeon will find this measure dispensable, for the reason that the finger will not have to be introduced into the rectum. After finishing all of the injections, the sphincter slackens and can be dilated, excised or burnt, according to pleasure.

#### VENOUS ANESTHESIA.

In 1908, Bier discovered a new way to bring the anesthetic in contact with the nerve substance. He injected novocaine solution in an exposed subcutaneous vein in an extremity that had previously been rendered bloodless by a rubber bandage. His experiments had shown that the vein walls were

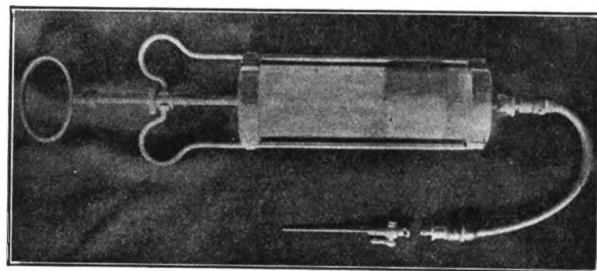


Fig. 4. Syringe and canula for venous anesthesia.

extraordinarily penetrable for watery fluids. The injected fluid therefore passed very quickly through the whole cross-section of the extremity between the ligating bandages and produced within this territory terminal anesthesia. He called this direct vein anesthesia. Since the nerve trunks passed through this territory, conduction anesthesia was produced in all parts of the extremity lying distal to the ligating bandages. He called this indirect vein anesthesia.

The technic for vein anesthesia is as follows: The whole extremity is made surgically clean. The limb is elevated, the vessels are rendered bloodless by a sterilized rubber bandage, which is tightly wrapped, beginning at the toes or the fingers, and extending above the knee or elbow, as the case may be. At the upper limit of this expulsion bandage a second rubber bandage is applied tightly around the extremity. Now the expulsion bandage is unwrapped for a distance of not less than one hand's breadth, or more than three hand's breadths, from the compression bandage, and here a second ligating bandage is applied. One of the large subcutaneous veins between the two compression bandages is now laid bare under infiltration anesthesia.

It is well to mark the location of the vein on the skin before the bandages are applied, as otherwise it may be difficult to locate.

The vein is now opened, a venous canula with two circular grooves near the distal end and a stop-cock near the proximal end is tied firmly in place within the vein and a 100 cc. syringe (Fig. 4), with a thick walled rubber tubing about eight inches long is used to force the solution into the vein. Considerable force must be exerted to force the solution through the collateral branches of the veins in the ligated section of the limb.

The solution used is one-half per cent. novocaine *without suprarenalin*. In the upper extremities 40

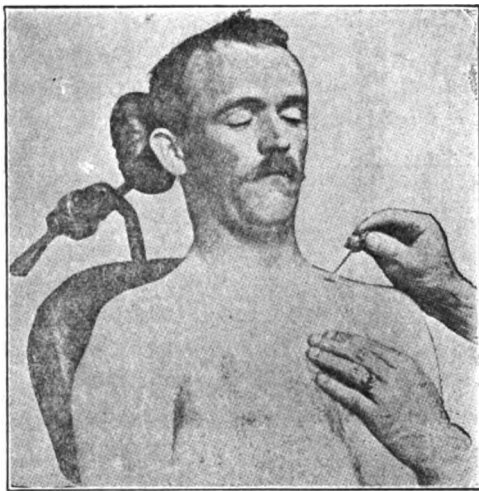


Fig. 5. Point of injection for brachial plexus anesthesia. (After Kulenkampff.)

to 50 cc. of the solution are injected and in the lower extremities 70 to 100 cc.

When the veins are necessarily cut during the operation they should be immediately clamped, or tied, so as to prevent loss of the solution. One must wait from five to fifteen minutes for perfect anesthesia to take place, and at any time should the distal compression bandage interfere with the operation it may be removed, for anesthesia will remain until the upper compression bandage is removed.

Venous anesthesia is indicated in all operations upon the extremities, except in the presence of senile and diabetic gangrene. When these conditions are present, plexus anesthesia may be used in its stead.

#### PLEXUS ANESTHESIA.

The technic of the plexus anesthesia is as follows: The patient should be in an erect sitting position or as nearly so as possible. A thin, hollow needle from three to six centimeters long is used for the puncture.

The injection of the brachial plexus is made at the point where it passes beneath the clavicle. This lies just external to the point where the subclavian artery passes beneath the clavicle.

In thin patients it is sometimes possible to see the pulsation of the artery at this point. But if this cannot be done, one places his finger near the middle of the upper border of the clavicle and the pulsation of the artery can be readily felt. The needle is now introduced at a slight angle, as shown in Fig. 5, just external to the artery and close to the upper margin of the clavicle. The depth of the plexus depends upon the amount of fat in the region, but in most cases the plexus lies from one to three centimeters below the surface.

When the point of the needle reaches the plexus, the patient will complain of a stinging sensation in the hand or arm; this sensation in the patient is the only sure guide that one has reached the plexus, and unless the patient feels it, it is almost useless to make the injection. Difficulty is sometimes experienced in locating the plexus, but, if one remembers that it lies immediately to the outer side of the subclavian artery, and moves the point of the needle slightly, it can be easily located. Should the subclavian artery or any other bloodvessel be punctured the blood will come through the needle. In this case the needle must be immediately withdrawn and introduced again, for it would be extremely dangerous to inject the solution directly into the circulation. After the plexus is located the needle must not be moved, but the syringe is attached and 10 cc. of a two per cent. novocaine and suprarenalin solution injected. The injection may go directly into the plexus or immediately around it; the result is the same.

In from one to three minutes anesthesia and partial motor-paralysis should begin to appear, and in fifteen minutes these should be complete. If, however, at the end of this time the anesthesia is not perfect and the motor-paralysis is not complete, 5 cc. of four per cent. novocaine suprarenalin solution may be injected through the needle, which has been left in place.

This anesthesia is applicable in all operations upon the hands and arms, including amputation below the level of the middle of the upper arm. Should the operation be above this point plexus anesthesia must be combined with infiltration anesthesia.

Plexus anesthesia should never be used on both sides of the body at the same time.

DEMAREE BUILDING.

# STRAIGHT DIRECT LARYNGOSCOPY, BRONCHOSCOPY AND ESOPHAGOSCOPY.

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BALTIMORE, MD.

(Continued from August Number.)

## CHAPTER VII.

### DISEASES AMENABLE TO TREATMENT BY TRACHEO-BRONCHOSCOPY.

**Tracheitis.** Those cases of tracheitis which do not respond to ordinary treatment can often be cured by topical applications through the bronchoscope. "Grip" tracheitis, which affects usually the anterior tracheal wall an inch or two below the larynx, and which shows itself through the laryngoscope or bronchoscope as redness and some thickening of the mucus membrane, and which often has a tendency to hold on for months despite treatment by cough remedies and external applications, is usually quickly cured by a few applications of nitrate of silver (2 to 10% solution). In some cases one or two applications will accomplish wonders, while in others more will be needed to cure. The highest number of applications made by the writer was ten. A few months ago a lady, 30 years old, consulted the writer for a cough of five months' duration, the sequel of an attack of "grip." She had tried all sorts of drugs with only temporary relief. The bronchoscope, which was passed with the head in the straight position, showed redness and swelling at the "point of election," about two inches below the larynx. Six applications of nitrate of silver were made to the trachea through the bronchoscope with the result that the cough disappeared. The applications are usually made twice weekly, beginning with the 2% solution and gradually increasing to the stronger solutions. Since the trachea is not sensitive, little or no anesthetic is required. Some years ago the same kind of a cough in a woman was cured by a few applications as described above; she had previously been treated for months with sprays, inhalations, and cough remedies. Treatment through the bronchoscope cannot be too warmly commended; with it many chronic tracheal conditions can be greatly improved if not cured. In the enthusiasm of the removal of foreign bodies, one is apt to forget that bronchoscopy has other valuable uses in the treatment of tracheal and bron-

chial affections. While the treatment of diseased conditions is not as spectacular as the removal of a foreign body, one earns the everlasting gratitude of patients by curing a troublesome cough which sometimes robs the sufferer of all interest in life.

**Ulcer of the trachea.** Formerly it was thought that all ulcers of the trachea were tubercular or specific; thanks to studies through the bronchoscope it is now a well established fact that catarrhal ulcers are not uncommon and can be cured by topical applications of nitrate of silver. Some years ago a young woman was referred to the writer with the history of a severe, tickling cough of several months' duration, which, despite all cough mixtures, did not allow a full night's sleep. The history of tuberculosis in the family and the fact that she was losing weight convinced the relatives that she had that disease, though no bacilli could be found in her sputum. The patient located the tickling just above the bifurcation; a prolonged stay in another climate did no good and she decided to try bronchoscopy. Though she was very nervous, the bronchoscope was passed; careful examination of the trachea revealed nothing abnormal until, about an inch above the bifurcation, a well defined ulcer was seen with its base covered with grayish exudate which, when wiped away, exposed the base, which bled slightly. Applications of nitrate of silver were made twice weekly for several weeks until the ulcer healed and the cough ceased. The patient had a deviated septum which was corrected by the submucus method. She immediately began to gain in weight and has since remained well. Equally gratifying results have been reported by Jackson and others. While "one swallow does not make a summer," this case proves conclusively that catarrhal ulcers do occur in the trachea and can be cured by proper treatment. In all obscure coughs without tubercle bacilli, the bronchoscope should be passed and careful search made for tracheal lesions. In this patient the separable speculum was used to pass the bronchoscope because the writer had not at that time learned the straight position which would have made examination and treatment much easier. In nervous patients the writer knows from experience that the straight position simplifies the examination very much.

**Tumors of the trachea.** Before the introduction of the bronchoscope tumors of the trachea were practically a sealed book, except those high up in the tube, which could sometimes be seen with the mirror. Since the use of the bronchoscope has become general, quite a number of tracheal tumors have been reported. Mayer has recently reported

a papilloma in the bronchus of a child which caused dyspnea and which was successfully removed through the bronchoscope with complete relief of symptoms. Three years ago a remarkable case came under the writer's observation. A woman, 35 years old, who had been operated upon six months previously for a large cervical gland, the pathological character of which was not definitely determined, developed shortness of breath. Her family physician was inclined to attribute the symptoms to nervousness, as was the surgeon who had operated upon her, since, whenever they saw her she was quiet and accordingly better. She insisted that her breathing was gradually growing worse, so Dr. J. J. Carroll examined her throat, but could make out nothing definite with the mirror. He then asked the writer to pass the bronchoscope. The patient was extremely nervous and, since it was before the day of straight bronchoscopy, the writer had some difficulty in passing the 5-millimeter tube. This was finally accomplished, however, and a good view of the trachea obtained. Below the thyroid gland a large tumor was seen growing by a broad base from the left wall of the trachea and leaving a small slit between the tumor and the right wall of the trachea through which the patient was breathing. The surface of the growth was nodular with numerous large blood vessels coursing over it. Since the tumor was so large and seemed so full of blood, it was thought best not to attempt removal of a piece for microscopic examination. It was realized that if interference caused serious bleeding, the patient would probably choke before anything could be done. The only method that offered any hope of relief was from outside operation. The patient was advised to come into St. Joseph's Hospital at once so that she could be constantly watched. A few days later, Dr. A. C. Harrison did a preliminary tracheotomy and shortly afterwards enlarged the tracheal wound and removed as much of the growth as was possible. He found that it extended some distance down in the trachea, and Jackson's long tracheal canula was introduced. The microscopic diagnosis was endothelioma. The patient has had several operations and is still living four years after the first operation with the aid of a long tracheal canula. She cleans and replaces the tube herself, is able to talk and seems to enjoy life. In this case diagnosis with the mirror was not possible, and it is probable she would have asphyxiated if the bronchoscope had not been used.

A woman, 62 years old, was referred to the writer by Dr. James Bordley for expectoration of

blood for some time. The patient was well nourished and nothing could be found to account for the blood. Eight months before the writer saw her, Dr. Bordley had removed the left eye for sarcoma of the ciliary body. The patient had an almost constant cough which prevented sleep. Under alypin anesthesia with the head straight, the 9-millimeter bronchoscope was passed without the separable speculum. Nothing abnormal was seen in the trachea or upper bronchi. When the terminal bronchi on the right side were reached, a fringe-like tumor was seen in one of them just where the tertiary bronchus came off. Blood appeared in this bronchus and when wiped away quickly reappeared. Unfortunately, the writer had no forceps small enough to remove a piece for microscopical examination; in appearance the tumor resembled a papilloma. In this case, Dr. T. R. Boggs had previously made a diagnosis of bronchial obstruction.

A few weeks ago a lady was referred to the writer by Dr. Bordley for expectoration of blood of two years' duration. There were no symptoms of tuberculosis and the lungs had been pronounced sound by Dr. Boggs. The blood, as a rule, would appear two or three hours after exercise such as horseback riding or dancing. The greatest quantity that had appeared at one time was about two ounces and always as clots. She had dilated veins at the base of the tongue which, after cauterization, did not stop the hemorrhage. Dr. Boggs, from the physical signs, thought there was some trouble in the left bronchus, probably a stenosis. Though the patient was very nervous, the 7-millimeter bronchoscope was passed at the first sitting, but just as the tube was about to enter the left bronchus, she became so restless it was thought best to remove it quickly to prevent possible injury. In this case the use of the separable speculum would have been absolutely impossible. The bronchoscope was passed with the head straight. The patient was given bromide of soda and told to return in a week for a second examination. After alypin anesthesia, the bronchoscope was again passed, and the bronchus examined; a narrowing of the lumen not sufficient to interfere seriously with breathing was found. No dilated blood vessel was seen and the origin of the bleeding could not be determined. In this case the small laryngoscope which was used in anesthetizing the larynx and trachea was tolerated badly, and bronchoscopy with the separable speculum would not have been possible.

*Chronic bronchitis.* Literature on the direct treatment of chronic bronchitis is scarce. Applica-



tions through the bronchoscope would seem the rational treatment, especially in young and middle-aged people. In a patient seen by the writer two years ago expectoration was so thick that when a bottle containing it was held upside down it would not run out. This patient had not had a comfortable night for years on account of attacks of asthma whenever the prone position was assumed. Bronchoscopy with the application of nitrate of silver of increasing strengths (from 2 to 10% solutions) was practiced with the result that the secretion changed to a thin, almost watery, character and became very much less in quantity. The asthma disappeared completely. Though the patient is not entirely well, his condition is much better and the results encourage the hope that with prolonged treatment he will recover entirely. In connection with this case the writer wishes to emphasize the dangers of cocaine as a local anesthetic in tube work. During one of the first examinations, a small quantity of 10% solution was used in his larynx and trachea. The patient left the operating room in good condition and soon afterwards insisted on leaving the hospital. He took a car and went uptown to get supper. He remembered nothing after paying his bill in the restaurant until he "awoke" the next morning in the University Hospital. At 9:30 o'clock that night he was arrested for being drunk and disorderly on the street; two policemen had all they could do to take him to the station house, where he had to be restrained to prevent his doing himself bodily harm. At 11:30 o'clock the writer received a message from a friend of his that, though he had an engagement to spend the evening with her, he had not appeared. To make a long story short, one of the resident physicians at the University Hospital, at the writer's request, went to the station house and, finding him quieter, took him to the hospital, where he was put to bed and watched all night by internes. The next morning early he seemed perfectly rational. When the writer saw him the second time between 1 and 2 o'clock, he was wild again. It turned out that he had had a hypodermatic injection of atropine; when the effects of this wore off, he was himself and soon made a prompt recovery. He then told the writer that the application of a belladonna plaster had caused the same symptoms. After this experience the use of alypin (20 to 30%) was resorted to with no bad effects.

*Stenosis of the trachea and bronchi.* The tracheoscope and bronchoscope have revolutionized the treatment of stenoses. Lesions, formerly impossible of diagnosis and treatment, are now open to

inspection and successful surgery. The removal of small tumors is now successfully done and the dilatation of strictures is fairly frequent. In advanced and stubborn stenoses low bronchoscopy is better than the high operation because a long tracheal canula can be introduced to keep the stricture open permanently if the lesion is confined to the trachea. Under this heading a very unusual case of stenosis of the trachea and bronchi will be described in detail because of its rarity and the difficulties attending its treatment.

G. McD., 30 years old, farmer, native of South Carolina, about two years ago began to experience some difficulty in breathing. His parents, brothers and sisters are all healthy and up to the time of his present illness the patient had been perfectly well. At first the difficult breathing showed itself only on exertion, but it gradually grew worse until it was constantly present, and the slightest exercise caused dyspnea. Occasionally alarming attacks of dyspnea and cyanosis would appear without any cause. His family physicians prescribed for him, but, finding that his treatment did no good, he took him to Atlanta, where different specialists were consulted. They made a probable diagnosis of aneurysm and declined to attempt bronchoscopy for fear of rupturing the sac. No specific history could be obtained, but in Atlanta two Wassermann examinations were negative. He was given mixed treatment on general principles and sent home. He continued to grow gradually worse, and March 1, 1912, he came to Baltimore for treatment. When the writer saw him the first time, his breathing could be heard over the room. Under morphine and hyoscine and alypin locally the writer immediately passed the 7-millimeter bronchoscope. Eight inches from the upper teeth a stricture of the trachea was found with a breathing space of only 4 millimeters. It was impossible to pass the bronchoscope through the stricture, so it was withdrawn and the 5-millimeter tube introduced, which, after some coaxing, slipped through to the bifurcation. The diseased process extended to the bifurcation and the bronchial tubes, both of which were narrowed to about three-fifths of their normal size. The diseased tissue had a red granular appearance, and the writer immediately thought of a malignant growth. Above the stricture the trachea was normal. The carina was greatly thickened—at least three times its natural size, and this added to the narrowing of the bronchi. For thirty-six hours after the dilatation the patient breathed better. Then the stricture gradually closed and breathing became rapidly worse; he was told that the opening

of the trachea was the only thing that would save his life. He finally consented to the operation and a low tracheotomy was done with the patient sitting, under local anesthesia. Just as the trachea was entered, the patient cried out that he could not breathe and fell back cyanotic and apparently dead. Jackson's small tracheoscope was forced into the trachea and through the stricture; with the help of artificial respiration and stimulation the patient soon recovered and was put to bed in good condition. That night the resident physician who had charge of the case went out, and at 11:00 o'clock the patient was cyanotic and almost dead from the plugging of the tube with blood and secretions. Dr. Devilbiss was sent for and, though he had not seen the tracheotomy and knew nothing about the case, promptly pulled the tube out and resorted to artificial respiration and stimulation, thereby saving the patient's life. A long Jackson's tracheal canula was ordered, but it was found to be too short to go through the stricture. A special tube was obtained from Pilling measuring four inches in length and nine millimeters in the inside diameter. The introduction of the tubes caused severe constitutional symptoms; the temperature would fluctuate between 102° and 104° and extreme prostration would follow. For some time the stricture was dilated from day to day without trying to keep the tube in. When the trachea became more tolerant, which happened in about two weeks after the tracheotomy, the patient was allowed to sit up. Every effort was made to find the cause of the trouble; a Wassermann examination proved negative, but on general principles two doses of salvarsan were given without any effect on the breathing. The patient could now wear his tube a part of the day; it would then have to be removed and a short tube substituted to keep the tracheal wound open. Treatment was begun March 1, 1912, and on April 1, when the constitutional symptoms had quieted down permanently and the writer was ready to begin the removal of the diseased tissue, the patient insisted on returning to his home. He was told that he should remain under treatment several months at least, but, as he was determined to go, he was cautioned to keep the tracheal wound open at all hazards. He did not do so, and two weeks later he had an attack which came near ending his life. A surgeon reopened the tracheal wound and forced the canula through the stricture; for the third time artificial respiration and stimulation saved his life. He returned to Baltimore the latter part of April to remain as long as might be necessary. Systematic treatment was immediately begun to remove the

diseased tissue. The 8-millimeter tracheoscope was passed through the tracheal wound and as much tissue as possible removed from the tracheal walls with Pfau's cutting forceps. The tissue was soft and friable and promptly returned. The operation was repeated from time to time with the same result. The high frequency spark was now tried, but without result. Repeated microscopic examinations showed always the same thing—chronic inflammation. The tissue returned so surely and so rapidly after these procedures that the writer felt like giving up in despair, when Dr. William Caspari suggested the use of pure chromic acid applications. The result of the treatment was magical; the acid, fused on the end of a probe, was applied directly to the diseased tissue through the bronchoscope. Wherever the acid was applied a yellowish slough would form which would be coughed up in a few days. Some apprehension was felt at first as to the effect of the acid when used so near the lungs, but beyond a slight burning sensation for some hours after the application, no bad effects were noted. The treatment was given once weekly and the improvement was marvelous. In a few weeks the tissue in the trachea had all disappeared and the walls were comparatively smooth with a diameter of about 12 millimeters. Just above the bifurcation there still remained a peculiar formation posteriorly which forced the end of the tracheoscope far forward to see the bronchi. The acid reduced this spot more slowly than the soft tissue above. By the first of August the trachea was in good condition and the patient was allowed to go to his home for a vacation. He had learned to take out the tube, clean it and put it back. During his stay at home he had an attack of malarial fever which put him to bed for two weeks. The latter part of September he set out to return to the Presbyterian Hospital. When he reached Washington, he noticed that his breathing was bad; he attributed this to the fact that he had had no opportunity to clean his tube on the train. On his arrival at the hospital he was in bad shape; Dr. Caspari in my absence removed the tube and gave him a hypodermatic injection of morphine, when he quieted down and had no more trouble. Late that afternoon the writer passed the tracheoscope and found the trachea and bronchi in about the same condition as in the summer. Chromic acid applications to the swelling just above the bifurcation were now resumed with the result that the lumen of the trachea gradually increased in size. About the middle of October, when everything seemed to be progressing nicely towards ultimate recovery, it

was noticed that the left bronchus was filling gradually with the same soft tissue that had given the trouble higher up. It was removed as well as possible with the forceps and chromic acid applied to the base. Healing was as rapid as it had been above; since then the bronchus has remained open and the patient's breathing is good. December 17 the patient took a short walk and returned to the hospital in good condition. One hour later he had a hard chill and his temperature immediately rose to 105.4°. Though nothing definite could be found in his lungs, all felt that pneumonia had developed and the patient was certainly doomed. The temperature began to fluctuate between 97° and 106°; one day the morning temperature was 96° degrees and in the afternoon rose to 106°. Dr. Gordon Wilson saw the patient, but would make no definite diagnosis; he advised large doses of urotropin. The patient continued to have his high temperature for two weeks longer, making a total of four weeks. His appetite failed and he rapidly wasted away. Finally when all were wondering at his wonderful vitality and speculating as to how long he could survive such temperatures, his temperature suddenly dropped to normal and remained there for two weeks, his appetite improved and he soon began to increase in weight. At the present time—the latter part of January, 1913—he is having temperature again varying from normal to 102°. He claims that his breathing is better than it has been for a long time. It is interesting to note that just about a year before this attack he recovered from pneumonia after a long illness. If he recovers from his present illness, an attempt will be made to substitute a short tube for a long one; if he breathes freely through this for a week, it will be removed and the wound will be allowed to close.

*Syphilis of the trachea.* In this country the severe specific changes are not as common as they are in Europe. In a large number of tracheal examinations, the writer has not seen syphilitic changes in the trachea. If gotten in time before contraction sets in, salvarsan is the proper treatment; its action should be as prompt in the trachea as in the larynx, where its effects are sometimes little short of marvelous. Bronchoscopy allows a prompt diagnosis in cases which formerly could not have been treated successfully.

*Spasmodic asthma.* Ephraim, in a recent article, claims remarkable results in the bronchoscopic treatment of asthma. In a total of 59 cases, he reports 37 cures running over variable periods, and 10 cases improved, while the remainder were not benefited. When one considers the hopelessness

of the asthmatic, these results are wonderful. In this country Freudenthal has treated several cases successfully. In his paper he states that the treatment must be long continued in some cases; that when one has about given up some patients, improvement followed by cure sets in. The writer has cured one case of asthma with the application of cocaine and adrenalin in the bronchi, while in another patient no good was accomplished. The usual treatment consists of the application of cocaine and adrenalin to the mucus membrane of the bronchi. There is no reason why argyrol and nitrate of silver could not do good in those cases in which the membrane is reddened and thickened. The treatment is justifiable in all cases of pure spasmodic asthma, since it seems to be the only means of affording relief.

*The diagnosis of the cause of obscure dyspnea.* Through the bronchoscope one can diagnose external pressure on the respiratory tract. If the so-called "scabbard trachea" is seen high up with the anterior wall pushed back or one lateral wall pushed over towards the other, one can safely diagnose thyroid pressure, though the gland externally may appear small. Further down the "scabbard trachea" may be caused by pressure from an aneurysm which can be diagnosed with remarkable certainty by the extreme, heaving impulse at the point of constriction. One case is recorded in which an aneurysm was mistaken for a tumor of the trachea; a piece of the "growth" was removed with biting forceps with death of the patient. In other cases a mediastinal tumor may be the cause of the constriction, and in children, especially, pressure from an enlarged thymus or a tubercular gland in the mediastinum which usually pushes the posterior wall forward. In tumors of the trachea of small size, removal through the bronchoscope should always be tried. In malignant growths low down the same measure should be resorted to to give temporary relief.

*Foreign bodies in the trachei and bronchi.* One of the most wonderful as well as one of the most interesting uses of tracheo-bronchoscopy is the removal of foreign bodies from the trachea and bronchi. A little more than a decade ago the majority of cases of foreign bodies in the lower air passages resulted fatally. The external opening of the thorax was nearly always fatal; in those cases in which tracheotomy was done, the foreign body, if in the trachea, was sometimes coughed out, but, if not, forceps were introduced through the tracheal wound to fish blindly for it. If the object was impacted in a bronchus, it was almost impossible of removal

by any method. In 1897, Killian removed a foreign body from a bronchus through the bronchoscope by throwing light down the tube from an electric headlight. Since then operators throughout the world have demonstrated the usefulness of the bronchoscope in this class of cases. Though many articles have appeared, it is a curious fact that many physicians and surgeons, some of them eminent, seem not to have heard of tracheo-bronchoscopy or having heard, do not take the trouble to inform themselves of its value. In this city—and the same thing doubtless happens in other cities—it occasionally happens that patients with foreign bodies in the bronchi are sent home without the removal of the object. Not so long ago, a boy was taken to a surgeon in a local hospital with the history of having a foreign body in a bronchus. A throat specialist attempted its removal through the bronchoscope, but only succeeded in pushing it two inches further down. Another specialist then tried it, but did not succeed in getting it. The patient was sent home and the father advised that the object would become encapsulated and would give no trouble in after life. In this case the foreign body, being metal, could have been removed with the method adopted by Iglauer in removing a small screw from the bronchus of a child under the most unfavorable conditions. The screw had been in the bronchus for some time, and when the bronchoscope was passed, a large pus cavity was found which prevented a view of the object. Since the removal of all the pus seemed impossible, Iglauer conceived the idea of trying to remove the screw with the giant magnet. A steel wire was passed through the bronchoscope and one end attached to the magnet. When the current was turned on a distinct click was heard as the screw leaped to the magnet. The magnet, wire and bronchoscope were then pulled away from the boy and the screw was found on the wire. In searching for foreign bodies in adults, the writer uses local anesthesia applied by means of a spray through the bronchoscope. If necessary to quiet the cough reflex, hyoscine is injected, which allows the passage of the tube with a minimum of anesthesia. In foreign bodies which are seen early, there is not much secretion in the tubes, especially if atropine is injected and there is little danger of filling up from absence of the cough reflex. In bronchoscopy it is a safe rule never to give an anesthetic if it can be avoided. The first foreign body removed by the writer was peculiar. A girl, 12 years old, was wearing a hard rubber tracheotomy tube for stenosis of the larynx. One afternoon the resident physician took the tube out to clean it and

replaced it without noticing that the canula was almost unscrewed from the plate. About an hour later as the girl was eating cake she suddenly choked and became cyanotic. The nurse was badly frightened and rushed down stairs with the information that the patient was dying. When the writer saw the girl, a few minutes later, she was quieter, but her breathing was bad. She was taken to the operating room, put to sleep, Jackson's 5-millimeter tracheoscope passed through the tracheal wound, and the tube removed from the right bronchus. The patient made an uninterrupted recovery.

In a boy, 7 years old, the bronchoscope was passed with the head straight in the removal of a grain of corn from the right bronchus. In a child, 2 years old, with a watermelon seed in the trachea, the 5-millimeter tracheoscope was passed without the separable speculum and the seed removed through it. In the methods described above the effort has been made to simplify the work so that every laryngologist can use it successfully.

It may not be amiss to refer briefly to the different methods of removing foreign bodies of various shapes and consistency. Sharp bodies such as pins, pieces of bone, etc., are better removed under general anesthesia, because of the danger of injuring the tracheal or bronchial wall with local or no anesthesia. The writer believes it is better to put older children to sleep under these conditions, while younger children as emphasized above should never be anesthetized. For straight pins any good forceps can be used to seize them. If the pin is sticking in the wall of the tube, it must first be carefully disengaged and then drawn out through the tube. Safety pins have to be carefully handled if open with the pin up. Jackson, Mosher, and McCoy have devised closers which render the pin point harmless. Jackson's instrument is very satisfactory, as is McCoy's, for small pins. A detailed description of these instruments would take up too much space. For soft objects such as bean extractors have been devised. Jackson uses an instrument which works on the same principle as the pin closer; the extractor is introduced straight, worked carefully below the bean and then by a special mechanism the end is turned to a right angle and the bean coaxed upward. Brunings has a "claw" forceps which is intended to grasp the body, but not to break it into bits as the average forceps often do. For removing buttons, special forceps are made, and Brunings has a tip to grasp a collar button a certain way. All these instruments facilitate removal of foreign bodies, and one who expects to do bronchoscopy must have at least one of each kind.

Hooks, because of their small size, are sometimes used to advantage to work below a foreign body and then to bring it up into the tube. So far the writer has succeeded in removing all foreign bodies with forceps which are always manipulated with gentleness. No greater mistake can be made than to attempt to use force in the extraction of a foreign body. As a rule they are ready to be removed and only slight traction is needed to start them upward. If a "granulation" stricture is in front of the foreign body, it must be gently dilated before any attempt is made to remove the object. Probably in no branch of medicine is a good view so essential and so difficult to get as in bronchoscopy. "Look before you leap" is the most important part of the work. After one has had a certain amount of experience, the removal of most foreign bodies is not particularly difficult. Even in children in whom the use of small tubes is necessary, the slender forceps will give a good view through the tube so that successful work is the rule. The writer is strongly opposed to tracheotomy until an attempt has been made to extract the foreign body through the larynx. Working through the 5-millimeter tube much can be accomplished, because in young children the object usually lodges in the trachea, which makes the working distance only a few inches provided a short tube such as Jackson's tracheoscope is used. In such cases the writer always uses a short, slender forceps, which is more easily manipulated than a long instrument. From what has been said above, it is evident that no hard and fast rule can be laid down for the removal of foreign bodies from the trachea and bronchi. Each case must be handled individually, the operator always bearing in mind the difficulties and complications which may arise in cases which appear the simplest. The writer can only repeat what has been said before, that, in his opinion, the best way to become an expert bronchoscopist is for one to practice in his hospital work with the smallest possible tubes so as to train the eye. In his work he uses small tubes and passes through them the largest possible instruments and then endeavors to see around the instrument, as it were. Touching certain spots in the trachea and bronchi is excellent practice. When the eye has been trained to see well through small tubes, there is no difficulty in working through the large tubes, and when it becomes necessary to examine young children, one finds that his practice has not been wasted. It is very difficult to see through Jackson's 5-millimeter tube in the beginning. But the writer is confident that if one will adopt the course advised above, he

will soon be able to see as well through the small as through the large tube, the field, of course, always being smaller. Successful work through small tubes is more gratifying and satisfactory because anyone can see to work through large tubes, while to become an expert operator through the small tube means hard and earnest work. It is true that the things that we work hardest for are the most satisfactory in the end. Having worked so long through the small instruments, the writer feels that he can conscientiously disagree with Brunings when he says that tubes smaller than 7.5 millimeters are practically useless.

*(To be continued.)*

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### MILITARY SURGERY.

GUSTAVUS M. BLECH, M.D.,  
CHICAGO.

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*(Continued from June number.)*

So far we have discussed the treatment of the average gunshot wound of the abdomen from the standpoint of the frontal aid stations.

We now come to review the problem when the patient is presented at the field hospital.

Here we have facilities for abdominal surgery or any other regional surgery, provided operative therapy is imperative. The experience with laparotomy in field hospitals, however, has not been good, the mortality being simply enormous.

Why? Not because the surgeons cannot operate under aseptic precautions, for the instruments and materials can be rendered sterile and hands and skin can be disinfected there as well as in any civil institution, but simply because the patient comes too late for laparotomy.

I will put it in this simple way, to avoid the possibility of misunderstanding: If the patient shows no signs of peritonitis when reaching the field hospital, there certainly is no indication for operative therapy, and if the evidence of peritonitis is present, the time for successful intervention has passed. Laparotomy in such a condition means simply to spread the peritonitic process and cause certain death.

Having missed the proper time, there remains only the conservative treatment and to await a more favorable period, say, when the patient can be transported to the base hospital, because there the therapy will be restricted to the relief of localized peritonitic processes, such as circumscribed abscesses which have been walled off.

We see that we have to follow a teaching which

in practically every respect resembles the views held at present for acute appendicitis.

In appendicitis laparotomy promises success the first twenty-four hours (except the foudroyant forms where aid is almost always too late); that time having passed, few surgeons risk operations and wait till the stormy phenomena have subsided. After that operation is safe.

The treatment at field hospitals, therefore, will consist of rest, ice-bag to the abdomen, Fowler position, saline clysmata, etc.

Medical officers with surgical experience will realize when they see a soldier suffering from acute peritonitis that operation is out of the question, because the grave prognosis is written on the brow of the unfortunate sufferer.

But, one will say, what about these cases which do not run a stormy course, the type commonly designated as sub-acute peritonitis?

In patients "lingering" with phenomena of peritonitis, section of the abdomen has proved a most extensive adhesive peritonitis. The entire ileum seems glued together, studded with little pus pockets. While admitting that the prognosis, both as to life and after well-being is very grave, surgery can hold out no promise of relief—if anything, disaster is invited by such rash measures.

The situation is different when we have to deal with extensive wounds, such due to portions from a burst shell. Here we may see a defect large enough on retraction of the wound margins to enable us to recognize intestine or stomach. If these are extensively torn and the patient's condition is not desperate, the viscera should be gently cleansed with sterile gauze sponges and an attempt made to close the visceral defects. Usually this will be in the form of closing the stumps by an inversion suture and performing lateral anastomosis.

A sad chapter is formed by the secondary hemorrhages. A missile that struck a vessel in the liver, spleen or hollow viscera may, while it remains lodged in the abdomen, act as a tampon. After a few days or even as late as nine or ten days, when one anticipates no fatal issue, the missile may become detached and produce thereby a fatal internal hemorrhage. In such cases, if the condition is promptly recognized and aid given, lives may be saved, but usually laparotomy will come too late, the patient dying from exsanguination in the course of a very few minutes.

The situation of the kidneys being extraperitoneal, makes the study of their gunshot injuries very interesting.

External hemorrhage of the kidney, if not appar-

ent through the appearance of blood from the wound channel proper, will show itself through the bladder, thus making the diagnosis comparatively an easy one.

In internal hemorrhages, we have conditions resembling injury to other glandular organs of the abdomen, with the exception that the hemorrhage is either intra- or extra-peritoneal. The former will offer such diagnostic difficulties that one will seldom be able to locate the source of the hemorrhage with precision; in extra-peritoneal hemorrhages, however, unless the hemorrhage is very profuse, a diagnosis may not be made for some time, that is to say until the blood accumulated in the retroperitoneal space has become infected and produces the clinical phenomena of a localized abscess—suppurative hematoma.

The treatment does not differ from that discussed for the abdomen proper. In the field hospital, it would be a mistake, however, to do what has been "accomplished" at the last Balkan war; the packing of the wound and retroperitoneal space with long pieces of gauze. Such a step means inviting sepsis and death.

No surgeon will hesitate to expose the kidney and to arrest hemorrhage by suture, because peritonitis need not follow such operations. This has its application only in the event we have to deal with kidney injuries pure and simple. In the event of the peritoneal cavity having become involved—and this will be the case most freely—the problem becomes the same as if we had to deal with intestinal injuries only.

Injuries of the *ureter*, not complicating abdominal injuries, are so rare that they can be ignored. A thorough study of the available literature convinces me that ureteral injury has never been observed. Where a surgeon has surmised such an injury from an existing sepsis the diagnosis is not free from objection. It is not inconceivable that the ureters have the tendency to slip out of the path of a small caliber missile, as soon as the tissues above it are touched.

Gunshot wounds of the bladder, however, represent, as a class, a grave injury, especially when, as has happened again and again, the bladder has been secondarily involved. In a primary wound, i. e., when the bladder has been hit by a small caliber missile, and it was not distended with urine previous to injury, the size of the injury is of prognostic importance. Where, on the other hand, adjacent bony structures have been shattered and the bladder torn by the fragments, the result is a frightful one.



The problems that present themselves refer to the ability of the bladder to hold urine, to the extravasation of urine into adjacent tissues or into the peritoneal cavity and, finally, whether particles of bone, hair or uniform have been forced into the peritoneal cavity.

An immediate diagnosis of a comprehensive character will scarcely be possible, especially since, owing to the contractibility of the external muscles, visual methods are possible only in extensive injuries involving the abdominal wall proper.

The first thing to observe, then, is whether or not the patient can pass water per vias naturales or through a small wound opening (fistula). If this be the case, we know that the injury has not been extensive and the only thing to fear is urinary infiltration, similar to that seen in civil life, and in the absence of a fistula we may even see good recoveries.

The patient does not pass urine per urethram or through the wound channel. We introduce a catheter and obtain either a few drops of urine or blood or both or the bladder is found to be empty. We must assume in such cases that the peritoneal cavity is receiving the urine and, of course, peritonitis is sure to follow.

In the frightful conditions above referred to, when bladder and adjacent bony structures have been destroyed, the bladder injury has only secondary significance; the general injury being such as to make almost any therapy hopeless.

The therapy depends on the condition present. The patient should have his external wounds dressed aseptically at the front and sent to the field hospital with the greatest possible despatch.

Our main reliance when the patient cannot empty the bladder spontaneously is on the catheter. Syphonage of the bladder is impractical and useless. If urine appears through the catheter this can be repeated as often as necessary, provided the little procedure is performed with extreme gentleness and aseptically. If the urine is not collecting in the bladder, urethral drainage will accomplish nothing except the irritation and infection of the viscus.

In all cases of urinary infiltration the indication is to operate. In this way the infiltrated urine is allowed to leave the tissues and a peritonitis may possibly be averted thereby.

Whenever possible an attempt should be made to close the bladder defect by suture. In those sad cases where the bladder has been destroyed beyond redemption the decision will rest between liberal doses of morphine to relieve the remaining few

days of the sufferer or risk excision of the ureters and their transplantation into the sigmoid.

We know from civil life that implantation of the ureters into the rectum is a risky procedure, because usually followed by an ascending pyelitis.

Personally I am in the belief that such an operation should be attempted and that a method described by Mirotworzeff in the Russian literature and later in the German periodicals is the one to be chosen. The frame of this serial is too small to allow of an extensive description of surgical procedures, with which surgeons are assumed to be familiar, so I will here state that Mirotworzeff has succeeded in successfully implanting ureters into what he terms the pelvic colon by suturing the ureters into the intestinal wall similar to the manner in which a tube is sutured in Witzel's gastrotomy.

It goes without saying that urotropin should be administered freely as well as intestinal antiseptics.

In civil practice we have a valuable preventive agent in vaccinothérapie; in the field, of course, this method cannot be made use of.

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#### ACUTE MYALGIA OF THE ABDOMINAL MUSCLES. A CONDITION TO BE DIFFERENTIATED FROM SURGICAL LESIONS.\*

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When a careful search of the available literature in the English, German, Italian and French journals, for the past eight years, reveals only three articles upon this condition it means one of several things; that the affection is a rare one; that it is more or less frequently present and undiagnosed; or that it is mistaken for some intra-abdominal lesion.

It would seem strange that such a thick bundle as the rectus abdominis and pyramidalis or the bulky layers of the combined external and internal oblique, with the transversalis, should not be the site of acute pain without intra-abdominal trouble while the trapezius, sterno-mastoid, deltoid, lumbar and gluteal muscles are often involved.

The fact seems to be, however, that we are prone, in the presence of abdominal pain, to at once boldly fasten the guilt upon some deeply situated organ and plunge from the exterior to the interior of the abdomen without regard to the structures interposed.

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\* Read before the Orange Mountain Medical Society, June 19, 1914.

One cause of this, I am sure, is the helpful or hindering leucocyte count; and it may be one or the other if too much importance is attached to it alone. Another and more potent evil is that the appendix lies, ready at hand, to shoulder the blame of a mistaken diagnosis if the condition happens to be a right-sided affair.

I am firmly convinced that myalgias of the abdominal muscles, without underlying visceral inflammations, do occur and much more frequently than is supposed; and that it is high time that the abdominal wall shouldered some of the blame for many an innocent appendix needlessly cut off.

I do not wish to underrate the perplexity often existing in a given case; but I shall try to point out a few things that may help to place the blame, in the majority of instances, where it belongs; and this is always more apt to be difficult than easy in any abdominal lesion.

The left-sided pain brings to mind the possibility of a kidney, colon or sigmoid affection; the right-sided one to an appendicitis, typhlitis or gall-bladder inflammation or perhaps a kidney cause; more centrally and above the umbilicus, duodenal and stomach ulcers are relatively frequent while below so often exist the pelvic conditions.

How shall we go about our work of attempting to differentiate? Is it possible to show a leucocytosis in cases of myalgia not involving the abdominal walls? I have seen the total count, in a severe gluteal case as high as 11980 and 12450 with a polynuclear rise of 73 1/3% and 85%, and in a shoulder and neck case, with severe pain, a rise to 10300 with the polynuclears to 78%.

This shows that there may be a moderate or even considerable leucocytosis in a myalgia of average or severe type with no viscera beneath to obscure the actual muscle condition.

The temperature and pulse may rise considerably, varying with the degree of irritation in the affected tissues and may, if the muscle pain is a very severe one, accompanying a myositis, simulate a septic remittent type.

There seems to be, at times, some coincidence with the spring and fall seasons of this condition. The history of exposure quickly followed by the onset of acute pain may often be elicited; or previous muscle pains, located elsewhere, help to put one on the right track.

A sharp tap on the belly of the muscles or, more particularly, their tendinous attachments, excites prompt pain when often gradual deep pressure offers a mild discomfort in comparison, and this is highly significant, as an abdominal lesion usually

gives more pain the deeper and firmer the pressure. If the belly is distended and tense from a peritonitis, this of course does not hold true, but the condition then is not usually a doubtful one.

The patients do not look abdominally sick, if I may use this expression, although this is, of course, not to be too much relied upon, as intra-abdominal lesions often fail to give rise to any typical facies or attitude.

Patients may or may not have severe pain upon using the affected muscles and these are not likely to be tense or rigid, rather more painful and tender than stiff.

Rectus muscle pain alone may be elicited by placing both thumbs on the outer border of one muscle and the remaining fingers on the outer border of the other and then pressing them together (Adolph Schmidt).

In visceral diseases, as I have said, we do not elicit much pain if the abdominal wall alone is subjected to pressure, except with peritonitis.

A few abridged histories of the abdominal type may be of interest:

Case 1. A woman, aged 22, of negative history except for mild leucorrhea, was caught in a hard rainstorm April 25, 1914, and got her feet wet. She slept poorly and began to have abdominal pain that persisted for twenty-four hours; she then endeavored to get up, which caused the discomfort to greatly increase. Bowels regular. Appetite good. On April 27th she was first seen by an attending physician; she still had considerable pain and tenderness in lower left quadrant of the abdomen opposite the umbilicus. No rigidity. Morphine hypodermatically gave quiet and sleep. Leucocytes, 16400; polynuclears 85.4%. Vomited once. The following day, temperature 98.8°, pulse 77. Tongue clean. No rigidity; pain much less. Leucocytes 12400; polynuclears 83.5%; lymphocytes 16.5%. A day later temperature 98.5°; pulse 72; tenderness diminishing and patient hungry. Following day (5th), no tenderness and patient out of bed. (Mount.)

Case 2. A boy of 6 who on two successive years and within twenty-four hours of playing in the snow and becoming thoroughly wet, was taken with acute abdominal pain referred to the right side. The legs were drawn up and any movement of the body caused intense abdominal distress. On the following day the pain and discomfort were about the same. (The first attack lasted about ten days; the second for several hours, and the child was then able to get up and play about.) The present attack is the third. Blood count at onset of the trouble: leucocytes 16000, polynuclears 81%, lymphocytes 16%, eosinophiles 3%. On the following day: leucocytes 21,200, polynuclears 80%, lymphocytes 20% in the morning. In the afternoon of the same day: leucocytes 18200, polynuclears 80%, lymphocytes 20%. Two days later: leucocytes

12400, polynuclears 80%, lymphocytes 20%. The next day: leucocytes 10400, polynuclears 78%, lymphocytes 20%, eosinophiles 2%. On the sixth day after the onset: leucocytes 8800, polynuclears 53%, lymphocytes 45%, eosinophiles 2%. Wassermann reaction negative. Slight reaction for acetone, urine otherwise negative. Temperature from 102° (rectal) to normal in four days. Pulse 140 to normal in four days. Seven days after the onset of the abdominal distress occurred much pain and swelling in left ankle; this disappeared under treatment in two days and the patient was apparently well.

Case 3. A boy, 10 years of age, much below normal, with a protuberant and flabby abdomen and often coated tongue who had for several years been subject to frequent attacks of so-called "sick headaches."

A month after I first saw him he had a recurrence of this type with a generally tender abdomen to the lightest touch and particularly so if the muscles were rolled between the fingers. The abdominal walls were soft and deep pressure did not compare in discomfort with that induced by tapping or rolling the muscles. There was some pain in moving the body to an upright position. Leucocytes 13000, polynuclears 78%.

After a brisk cathartic the headache disappeared and the muscle pain ceased in two days. (This is a type from auto-toxemia.)

Case 4. An adult female in the forties had been ill, for about five days before I saw her, with severe pain in the left lumbar, anterior abdominal and left rectus muscles. When I saw her it was with only the greatest pain that she could raise herself to a sitting position and gentle finger percussion gave rise to acute distress. Temperature 99.2°, pulse 96, leucocytes 7200, polynuclears 67%. The pain and tenderness completely disappeared in thirty-six hours under the administration of aspirin, phenacetin and hot applications.

Case 5. A man in the thirties had an attack of influenza. On the seventh day there occurred sudden general abdominal pain to the lightest palpation, but he could raise himself in bed with little or no discomfort. No rigidity and hardly any discomfort on gradual deep palpation.

In a few days under drug treatment he was entirely free from any symptoms and left the hospital. (A type from an acute infectious disease.)

Case 6. A girl of 14. Marked abdominal pain and tenderness over the right side of the abdomen; also to a lesser degree on left side. Some nausea. Diagnosis: acute appendicitis. At the operation a normal appendix was removed. On the second day following the temperature rose suddenly to 104°. Examination of the blood showed malarial plasmodia. A quick disappearance of all muscle pain and tenderness under large doses of quinine. (A type of specific myalgia.)

By what route is the pain transmitted! Possibly the cerebro-spinal nerves carry the impulses in pathological conditions, for normally the muscles are practically insensitive. (A. Schmidt.)

Concerning the causes we again encounter difficulties.

Is the disease due to an inflammation of the white fibrous tissue of the parts involved, mild or severe in character, and acute or subacute in type, brought about by some chemical irritant or microbic toxine conveyed by the blood? (H. H. Sutton.) Or are substances in the circulating fluid precipitated by exposure to wet or cold in crystalline or amorphous form, causing stiffness and pain? (H. H. Sutton.)

At any rate, why the pain should attack the sterno-mastoid, trapezius or deltoid at one time and at a later period, in the same individual but less frequently, the lumbar or abdominal muscles, is an interesting problem and as yet far from being solved.

May it not be really a short or prolonged muscle cramp due to increased tonus of the muscle bundles, producing pressure by traction upon the numerous nerve plates situated throughout these tissues and therefore particularly liable to irritation and compression where the muscle is less flexible and yielding, namely, in the tendinous or fibrous attachments? The pain, as we know, is usually the most severe in these locations.

The so-called auto-toxemias evidently play a large part in producing the conditions in many individuals and indican, in excess, may occasionally be present.

The colon bacillus is probably the most common bacterium carried through the blood stream at these times and is possibly the cause of the more prolonged and severe attacks. We have spoken of influenza and malarial plasmodia as other causative factors.

I have purposely avoided throughout the loose designation of rheumatism, believing it to be safer to look somewhat closer for the producing causes than for remedies, although the salicylates, aspirin and phenacetin, which are also presumably blood disinfectants, in association with the salines and heat, are the most useful means of relieving the condition.

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OBSERVATIONS ON LACERATED AND  
CONTUSED WOUNDS.

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The most common wounds calling for treatment by the surgeon and practitioner in the country and smaller towns, as well as the city, are of the lacerated and contused variety, and such a radical change in their treatment and management has taken place that it may be of interest to note the present, in contra-distinction to the past methods of caring for such wounds.

These injuries are solutions in the continuity of the soft parts, produced by a dragging force or trauma, with blunt instruments, blows or tools. Infection with bacteria usually takes place at the same time the wound is produced through dust, oil, cinders, dirt and machinery grease, which are often ground into the tissue at the time. These wounds bleed less than the incised, because the vessels are torn or twisted, and the torn and irregular edges favors the coagulation of the blood. The gaping or separation from such injuries is not so marked as in incised wounds; the tissue is often crushed and pulpified. The pain from such wounds is dull, throbbing and aching if the nerve is not divided, but if pressed upon near the crushed parts the pain is continuous until the nerve is divided or released. From the above fact, contused wounds are more painful than incised wounds, but bleed less.

Shock is largely dependent upon the place of the blow, the sensibility of the patient, and the amount of crushing injury; in avulsion and crushing of bones of both limbs, as in railroad accidents, the shock may prove fatal. Healing in very slight wounds of this kind may take place without much inflammation. The separation between the tissue is filled with small coagulum, or blood clot of fibrin, which acts as nature's sticking plaster, bringing the edges together; this fibrin forms a thin scab over the wound, under which healing takes place.

The majority of contused and lacerated wounds, however, heal by second rather than first intention. The first desideratum in all these injuries is to get rid of whatever infection has been forced into the wound at the time of the injury, at the same time arresting any hemorrhage which may be present and approximating the parts as snugly as possible. It should always be remembered that reactionary hemorrhage may take place in lacerated or contused wounds when the temporary plug that stopped the vessel is blown out by reaction, or there may be secondary hemorrhage from sloughing tissue, in-

cluding the veins and arteries; hence it is important that all risks of hemorrhage from these sources be attended to at the first dressing. Hydrogen peroxide, diluted half with sterile hot water, poured freely into such wounds, with the flaps held up so that all the crevices of the wound may be filled, aids in boiling out the foreign particles of dirt and infection and at the same time acts as a good hemostatic. The use of the peroxide of hydrogen at subsequent dressing may be questioned, particularly if delicate epithelium has begun to cover the wound; all applications should be very mild at this stage of healing. After washing out the wound with sterile water, all pulpified tissue and skin that is known to be dead from lack of blood supply or comminution may as well be removed with forceps and scissors, as to be left to slough and infect the wound later.

It is proper to state here that owing to the abundant blood supply to the hands and feet that many apparently destroyed extremities have been saved by conservative surgery. The recuperative power of nature in mending these members should always be given a chance. One can amputate later if the member is destroyed, but one can never retrieve the mistake of amputating too early.

One of the means of arresting hemorrhage from these wounds is by pouring an abundant supply of hot water into the wound, which flushes out the foreign bodies driven into the wound, and constricts the bloodvessels. If these crushed wounds are over bony prominences, compression is better for arresting hemorrhage than by putting in unnecessary ligatures which increase the risk of infection. Sterile gauze pressed into the wound as a compress or held with firm pressure under digital compression, checks the average bleeding and pain within a short space of time. Where a larger artery is concerned a ligature or suture is required. Fingering in the wound, or further traumatizing the tissue, should not be allowed. Hemostatic forceps and torsion will help to control the smaller vessels better than ligatures, which might carry infection. Chemical styptics have no place in the arrest of hemorrhage in these wounds, as they destroy all chance of union by first intention by the introduction of a foreign body into the wound, so they are only mentioned to be condemned. Their use may be permitted upon malignant or sloughing wounds.

The treating of all non-operative wounds resolves itself into not only cleansing the wound, but fixing the cells and epithelium, and cleansing as well the tissue adjacent to the wound, not by washing and scrubbing with strong soaps, as formerly done, but by wiping (rather than washing the wound) with

such substances as chemical solvents for the grime or grease, and always away from the wound. The grease or oil from a machine accident can best be removed by first applying a half-alcohol-half-tincture-of-iodine directly into and around the wound, then cleansing the wound by wiping away from its edges with sterile gauze saturated with turpentine, gasoline, ether or benzene.

Infection by this method is much rarer than when the injured part is scrubbed with soap and water, in a vain effort to cleanse a hand into which an accumulation of grit and stain has been ground for months or years.

The preliminary painting of the parts with alcohol and tincture of iodine seems to destroy all the skin germs. If it is a hairy portion of the body that is injured it may be soaped and shaved away from the wound. Not only are all foreign bodies to be removed at the first dressing, but also, particles of crushed bone if devoid of periosteum are likely to act as foreign bodies and should be removed, as should all other thoroughly dead tissue.

The future function of fingers has been greatly benefited by suturing divided tendons, muscles and nerves together. It is best to slit up pockets of wounds, if necessary to gain entrance into cranies where foreign bodies may have been lodged; mopping out the thoroughly exposed floor of the wound with equal parts of tr. iodine and alcohol, and placing gauze drains into the deeper recesses is a safe method against infections. The suture in such wounds should be interrupted and tied loosely, so as to hold the edges of the parts together and to admit of free drainage, as this is imperative, particularly in large lacerated wounds. If the soft parts are not so pulpified as to make dead and living tissues look alike, a moist antiseptic drip from an irrigator over the injured part, which is supported by a Kelly pad, is a good procedure for twenty-four to forty-eight hours, until it can be determined what can be saved, and what is irretrievably lost. This drip in Winter should be kept warm, and mildly antiseptic. A saline solution or large moist warm dressing may be substituted for this drip over the injured part.

The redressing, if the bandages are not much soiled and no pus or pain is present, need not be repeated until the second or third day. The rule of dressing such wounds daily is a mistake, unless the are infected, sloughing or very painful. Fever is the forerunner of general infection or cellulitis which occasionally follows such wounds.

When wounds are already seriously infected before they come to the doctor, which is often the

case, the treatment should be by saline drip, 1-5000 bichloride of mercury or one-half of one per cent. carbolic acid solution, until all suppuration has stopped and inflammation subsided, to be followed by dusting powder of subiodide bismuth or one-half tr. iodine and one-half alcohol, and then covered by sterile gauze.

The treatment of such wounds by pure carbolic acid, followed immediately by alcohol to neutralize the acid, has not been followed much, as it is considered too heroic.

Coaptation of the wounds is essential for their ready healing, as a wound well sewed is half healed. All sutures should be put in loose to prevent tissue necrosis after the wound swells. Many times a gaping wound can be pretty well approximated by adhesive plaster. When it becomes necessary to use sutures, they should be interrupted and of silk-worm-gut, if the wound is to be kept moist all the time, to prevent absorption before the wound is healed. We have used retention sutures to good effect where they held granulating edges together.

Draining from the most dependent part of the wound is very important. Making a stab wound through the skin on the opposite side of the limb often facilitates the drainage. In these large wounds where the question of infection is not settled, we should apply primary drainage and secondary sutures, i. e., sutures not tied when first put in, but left loose to be tied when the risk of infection has passed, and the drainage gauze removed. Gauze drains, rubber or perforated tubes may be used for the first forty-eight hours, to be removed at the second dressing.

Rest is next in importance to asepsis in these cases of injury, and to obtain it becomes necessary to keep the patient in bed, the arm in a sling, or a limb in splints. Immovable dressings that prevent muscular action reduce the amount of pain, and promote healing. All limbs with large lacerated wounds should be immobilized by bandages, splints or other methods.

The routine injection of 500 ccm. of anti-tetanic serum in all these lacerated wounds has become the rule in all busy surgical clinics. Whether less tetanus is due to the injections of the serum, or to better cleanliness and dressing methods, it is impossible to say. The serum has no curative property after tetanus has developed. It is supposed to be only preventive.

The above methods have been applied in the largest clinics in the Charity Hospital, New Orleans, for the past few years with the best of results and fewest infections.

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**WALTER M. BRICKNER, M.D., Editor**

NEW YORK, SEPTEMBER, 1914.

## WHAT WILL SURGERY LEARN FROM THE PRESENT WAR?

The European war is drawing to its field and base hospitals famous surgeons of their respective countries (thus von Eiselsberg is surgeon-in-chief of the Austrian army and Bier, of the German army), and many other medical men whose names are less widely known or known not at all. That the opportunities of the great conflict will make the reputations of some of these men is to be expected. That they will develop among them an Esmarch or a Jonathan Letterman is quite possible. But that the experiences of these battlefields will provide no important contribution to surgery itself is also at least likely.

The surgical annals of the Boer war make vastly different reading from the medical and surgical history of the Civil War, for example, with its grim records of amputations and hospital gangrene; and the camp sanitation and field hospital work of the Japanese in 1904 were, likewise, vastly better than those in our own army in the Spanish-American war only six years earlier. But to-day military hygiene is standardized and well-nigh perfect, and the behavior and treatment of wounds by modern missiles are quite well established. The character of these missiles has not been changed, as far as we

know since the Turko-Italian and the two Balkan wars. It would seem, therefore, that the surgical experiences of the present great war will differ in volume, rather than in kind, from those of the other all too frequent wars of very recent years. It is perhaps in the opportunities to apply our newer methods in vascular and intrathoracic surgery that the most fruitful opportunities will develop.—W. M. B.

## THE MEDICAL RESERVE CORPS OF OUR ARMY AND NAVY.

At this sad time where one after another of the great nations of the earth is being drawn into the vast conflict of arms, it is comforting to us, unfettered by entangling alliances, to feel that two broad oceans separate us from the battlegrounds of Europe and of Asia. Since we settled our own internal differences a half century ago, we have engaged in but one short war and that in a spirit of altruism. But the shadow of war has fallen upon us several times. It is but a few weeks since we were held back from the very edge of war by the calm determination and wisdom of our executive. It is but sixteen years since we were actually engaged in a war that unexpectedly brought us an Oriental possession which, in the present situation, must perforce give us some concern. Even now we have a military force along our Texas frontier and our army and navy recently took possession of a foreign city where some of our marines were killed in a miniature battle. And so this peace-loving and essentially unmilitary nation may some day again feel obliged to resort to the same genteel argument that the other highly civilized nations employ, with no diminution of frequency, in the settlement of their disputes.

We abhor the militarism of Germany, we deplore the necessities that put its burden on the people of that country; but we cannot fail to admire the detail-perfection in all the departments of that huge military organization which, by instant magic, placed it, fully equipped and active, on two frontiers! To the extent that we make preparations for possible war those preparations should be just as complete and perfect. It is, however, only the preparation of the medical arm of our military forces that concerns us in these pages. To meet the necessity for a rapid enlargement of our army medical organizations, Congress some years ago created a Medical Reserve Corps of the U. S. Army (on the active list in which all prospective officers of the Medi-



cal Corps must now serve for a year or more), and subsequently it established a similar corps for the Navy.

At first there were appointed to these reserve corps men distinguished in medicine, but many of them, physically or otherwise, unfit for active service. More recently the requirements for admission to the corps have been applied more rigorously, and of the approximately 1,400 now commissioned in the Army Medical Reserve Corps, there are very many young and active men. The obligations of the commission, except in honor, are not as binding for service as commissions in the regular corps, and not all of those in this reserve could be counted upon in time of need. Of the many others, however, who would answer a call for their services, there are only a few who, beyond their civil experience, have any training whatever for the work that would devolve upon them. To be sure, in active service many of the reserve corps would be used at hospitals in large cities, at recruiting stations and in concentration camps, but others would probably be needed at the front where field service and camp sanitation would involve altogether unfamiliar duties.

The War and Navy Departments have thus far done very little to train these reserve bodies in the work that active service would throw upon them. A small beginning has been made, however. In the veteran encampment at Gettysburg a year ago two dozen of the army medical reserve corps were on duty and had a valuable lesson in the rudiments of camp sanitation and field hospital management. An equally small group enjoyed a similar opportunity this year, as guests, in the camp of the Third Field Artillery at Tobyhanna, Pa. Here, from June 27 to July 4 they were under the tutelage of Majors H. L. Gilchrist, the chief instructor; E. E. Persons and John H. Allen.

The strict régime of military life, the lectures and actual field work from early morning until sundown, the experiences of long rides, the unspoken instruction in military etiquette, the mingling with medical men of the highest type who know how to conduct themselves with military exactness, all provided a valuable lesson. But these two small opportunities came to only a handful of the corps. If those corps are to be fitted for what their commissions may some day call them, the instructions should come oftener and to all.—W. M. B.

## THE ANESTHESIA SUPPLEMENT.

The interest aroused by the JOURNAL's announcement of a quarterly 32-page supplement devoted to anesthesia and analgesia bespeaks a warm welcome for what we are about to put forth as a needed contribution to medical journalism. There is ample evidence, too, that this interest is by no means limited to specialists in anesthesia.

The first issue of the supplement, which will appear with our next, October, issue, is to contain the following contributed articles: The Relation of Anesthesia to Acidosis, by George W. Crile, of Cleveland; Insufflation Anesthesia, by F. W. Nagle, of Montreal; A. Physiological Consideration of Surgical Shock, by Prof. F. W. Pike, of Columbia University; Local Anesthesia in Hernia Operations, by James F. Mitchell, of Washington, D. C.; The Treatment of Post-Operative Shock by Prof. Charles Lieb, of Columbia University; Prophylaxis of Post-Anesthetic Vomiting, by H. Warren Buckler, of Baltimore.

Those thus far chosen to be associated with Dr. F. H. McMechan, of Cincinnati, in editing the Anesthesia Supplement are: Prof. Yandel Henderson, of Yale University; Charles K. Teter, Cleveland; James T. Gwathmey, New York; Willis D. Gatch, Indianapolis; Wm. H. DeFord, Des Moines; E. I. McKesson, Toledo; Isabella C. Herb, Chicago; Arthur E. Hertzler, Kansas City; and, in London, England, Dudley Wilmot Buxton and John Desmond Mortimer—all of them prominent as anesthetists or as investigators of the problems associated with surgical narcosis and with shock.—W. M. B.

## Surgical Suggestions

In planning the incision for umbilical hernioplasty it is worth a little extra effort to restore, if possible, the normal umbilical depression.

As a preliminary to operating for hypospadias divide all fibrous and skin bands that curve and shorten the penis, and allow the wounds to heal with the organ stretched.

Before operating for empyema thoracis aspiration on the table should be done always even though pus has been found by previous puncture. Nor should the chest be incised until the location of the pus is thus determined accurately on the operating table.

## Surgical Sociology

Ira S. Wile, M. D., Department Editor.

### SOCIAL SERVICE AND DISPENSARY ABUSE.

The problem of dispensary abuse is constantly recurring, and various means have been suggested for its elimination. Societies interested in medical economics have repeatedly suggested plans for alleviating abuse with the basic idea of safeguarding the welfare of the medical profession. It is unfortunately true that most dispensaries, in their theoretical value, are organized for the benefit of the public rather than for the extension of clinical practice to physicians and surgery. Philanthropy, not education, has been their underlying motive. The financial saving represented by dispensary treatments has never been determined with any approach to accuracy. Such figures as those presented by Fussell, of Philadelphia, merely approximate the vast extent of dispensary care afforded in large municipalities.

At the Lakeside Hospital, in Cleveland, the social service department is being utilized for the purpose of curtailing dispensary abuse. Under the plan there in operation, patients admitted for treatment are divided into four general classes: (1) Those who are without funds and unable to pay for treatment. (2) Those without funds for the immediate complaint for which treatment is desired, but who possibly may be able to pay for future illnesses. (3) Those admitted for special examinations or for major or minor surgery. (4) Those admitted merely for special examinations or who come because of dissatisfaction with their own physicians or because they cannot afford a specialist, etc.

The entire control of admissions to dispensaries should be in the hands of the social service department. This would guarantee to an extent, not now possible, the proper regulation of admissions on the basis of social, medical, and economic necessity. The ethics of the profession are then far better conserved and there is less likelihood of dispensary abuse by physicians in and out of dispensary, as well as on the part of the patients themselves. By combining the admissions and the follow-up work under the care of a single social service department, greater unity is produced. There is some reason to believe that the actual work accomplished is of greater social benefit and there is less chance

for exploitation of the dispensaries and the attendant physicians by those fully competent to employ the services of regular practitioners.

The mere fact that the State laws define the type of persons who are entitled to dispensary privileges is no guarantee that the law is being carried into effect by the dispensary authorities; nor indeed is the general public cognizant of the wording of the law. Furthermore, the strict interpretation of the law would frequently cause manifest injustice to individuals really deserving special service from dispensaries on the one hand, and on the other hand, it might operate to cause deceit and irregular methods of securing dispensary service on the part of the unscrupulous, the undeserving, the dissatisfied, and the avaricious.

Undoubtedly, there are many objections to placing all problems of admission into a social medical service. Inasmuch as the social service department is organized for the social betterment of the dispensary, it becomes a legitimate function of this department to consider this phase of dispensary administration. Such organization would probably protect the dispensary from abuse to an extent that is impossible under the present form of organization, while at the same time it would insure fairer dealing with the poor, the ignorant, the suffering and the deserving persons who seek the benefits which are possible for them only in a dispensary.

### THE WAR OF RACES.

Swords are again unsheathed and the boom of cannon has aroused the patriotic spirits of civilized Europe. The shell of peace on a pretext so slight as to seem almost insignificant has given way to the hell of war. The trial of our wonted civilization was at hand and the vandal spirits overcame the spiritual tendencies and commercial stability, educational progress and international friendships. Surgery, disease, invalidism, pensions, poverty, crime and desolation will follow the trail blazed by the vast armies now engaged in international conflict.

The tests of modern sanitary science were made in the Russo-Japanese War, but the wide field of comparison of the methods of nations is now open to view. The systematic study of military hygiene together with the organization of medical departments for prompt administration in field and base hospitals should evidence splendid results in the protection of the conditions affecting the soldiers.

The great distress of the war will not be the

physical injuries, the sufferings and the tortures of the battlefields, but will fall upon those non-combatants who forsooth must remain at home to guard the industrial and social honor of their country. They have keener anxieties, greater sorrows, and far more enervating experiences. It is their brothers, husbands, and fathers who are plunged into the conflict. The surgery of the battlefield pales into insignificance, save as a dramatic occupation in a great war, compared with the baneful effects of the war upon potential parenthood on which nations depend for future soldiers.

The effect of this international struggle will be felt for years to come, not merely because of the empty coffers to be refilled through sweat and taxation, but in the line of weakened citizens, impoverished families, and deterioration in racial stock. Not the greatest war in the history of the world is this, but the saddest, the most unspeakable, and the most potent for affecting the welfare of the world in the future. War itself is such a pathological growth that some greater surgery is necessary to eradicate its causative factors so that the future may make the art of surgery one for the betterment of mankind in peace and plenty. The greatest war is the peaceful competitive struggle for existence in international amity. Are we little lower than the angels or merely a little higher than the devils? Man is still at heart a barbarian, though his mind seeks to control the primitive impulses. Spiritualizing has scarcely gotten into his soul. Until the mind and soul co-ordinately control men, military surgery will remain a necessity of the nations called civilized. International peace is a rainbow—would that the nations could stumble on the pot of gold.

When performing amputation, arthrectomy, osteotomy or similar operation, it is wiser to leave the constrictor in place until the dressing is partly, or entirely, applied, than to remove it after tying the large vessels, in an effort to secure the small ones. In the former case the snugly applied dressing will safely prevent hemorrhage; in the latter case there may be an alarming loss of blood from the numerous small vessels in the very time the efforts are made to tie them all.

After major amputations an elastic constrictor should always be left at the head of the bed, so that the nurse can immediately apply it in case of secondary hemorrhage.

## Book Reviews

**The Practice of Surgery.** By RUSSELL HOWARD, M.S. (Lond.), F.R.C.S. (Eng.), Surgeon Poplar Hospital; Assistant Surgeon London Hospital; Joint Lecturer on Surgery, and Teacher of Operative Surgery, London Hospital Medical College. Large octavo; 1227 pages; 523 text illustrations and 8 colored plates. Philadelphia: J. B. LIPPINCOTT Co.; London: EDWARD ARNOLD, 1914. Price \$5.50.

Unstinted praise should be given to Howard for the effort to produce a satisfactory single volume of surgery for beginners. His effort has been successful, we believe, because rare judgment and common sense have been brought to bear upon it. Evidently the author realized the hopelessness of attempting to include everything of importance in his work. He therefore sets clearly and succinctly before the reader the essential facts concerning each subject, omitting theory and detail. No attempt is made to give details of operative procedures.

Although a work chiefly meant for students, it is one from which the trained specialist may learn, especially from the broad views of subjects that the author generally assumes. To students it cannot be recommended as the only book on surgery to be in their collection, but it is most highly recommended as a central storehouse of surgical information, the details of its stock to be gleaned elsewhere.

**Abdominal Surgery. Clinical Lectures for Students and Physicians.** By THORKILD ROVSING, Professor of Clinical Surgery at the University of Copenhagen. Edited by PAUL MONROE PILCHER, A.M., M.D., Brooklyn, N. Y. Large octavo; 477 pages; illustrated. Philadelphia and London: J. B. LIPPINCOTT COMPANY, 1914.

The work of that brilliant and original mind, Thorkild Rovsing, is universally known, and a preparation for English-speaking surgeons of these lectures is altogether acceptable. We should, accordingly, be grateful to Pilcher for having taken up the task of editing these lectures. He states that the original ideas of the author have been preserved, sentence for sentence, in order that the work may lose none of its individuality. The translation must have been excellently done, for one does not find that peculiar clumsiness of style so often manifest in translated works.

There are some statements and opinions advanced by the author to which general exception might be made. These are so overshadowed by interesting and important facts, however, that Rovsing's lectures should be read by all interested in the surgery of the upper abdomen.

**Guiding Principles in Surgical Practice.** By FREDERICK EMIL NEEF, B.S., M.L., M.D., New York City. Duodecimo; 180 pages; illustrated. New York: SURGERY PUBLISHING COMPANY, 1914.

For those to whom surgery is a daily practice this small book is not intended. But for the student about to be launched into practical medicine without adequate hospital training, and for the practitioner who has not had basic training in surgery, it is invaluable. It presents a clear, common-sense analysis of the principles that underlie the preparation of the patient for operation, of the instruments, of the surgeon's hands, and of the dressings; the methods of general anesthesia; the post-operative care of the patient, etc., etc. Of the excellent chapters in the book the reviewer believes that that dealing with the healing of wounds is the best, and can be read with advantage by the advanced student as well as by the novice. Attractively written and artistically printed, and embellished with marginal titles in red ink, the book will make pleasant and very instructive reading to those for whom it has been recommended.

**Diseases of the Rectum and Colon and Their Surgical Treatment.** By JEROME M. LYNCH, M.D., Professor of Rectal and Intestinal Surgery, New York Polyclinic; Attending Surgeon, Cornell Dispensary; Fellow of the American Proctologic Society, New York Gastro-Enterological Society, etc. Octavo; 583 pages; 228 engravings and 9 colored plates. Philadelphia and New York: LEA & FEBIGER, 1914. Cloth, \$5.00, net.

This work commends itself by its systematic arrangement; by the modernity of its viewpoints, sustained throughout; by the author's careful attention to minutiae in the descriptions of operations, manipulations and examinations, and by the unusually fine photographs and colored plates by which it is embellished.

There is very evident a conscientious effort by the author to produce an enduring work, in which, however, he has fallen short in several respects. His style of writing, though sufficiently clear, is colloquial and occasionally ungrammatical. He seems too inclined to agree with everybody and the reader is often left in doubt of Lynch's own opinion and of the relative merits of various explanations. There is, too, much needless repetition, and, we think, too much mention of doctors who have referred cases to the author, and of private clinics where operations have been performed.

First editions of medical text-books are apt to display faults, however, and we doubt not that a second edition of Lynch's in many respects excellent work will see the shortcomings of the first issue corrected.

**A Treatise on Diseases of the Rectum and Anus.** Edited by A. B. COOKE, A.M., M.D., assisted by nine collaborators. Octavo; 619 pages; 215 illustrations in the text and 21 full-page plates, 7 in colors. Philadelphia: F. A. DAVIS COMPANY, 1914. Price \$5.50.

This work, in great part written by the editor, has a far wider scope than the books on the same subject that have appeared within recent years. While the essential proctologic conditions receive ample consideration, it is pleasing to note that the dictum of the editor, namely, that "the first requisite is to realize that we have to do with a patient, not merely with a rectum," has been fully appreciated by the collaborators. One chapter on rectal pathology due to extra-rectal causes, and another on the relation of rectal diseases to the general health, serve to illustrate the broad, modern viewpoint of the editor and at the same time to enhance the value of the work. The latter will, it is hoped, be further promoted in the future by a more careful survey of the broader surgical and pathological literature on the one hand, and by the elimination of a great deal of the purely didactic quotations on the other hand.

**The Treatment of Neurasthenia.** By DR. PAUL HARTENBERG. Translated by ERNEST PLAYFAIR, M.B., M.R.C.P. Duodecimo; 283 pages. Edinburgh, Glasgow and London: HENRY FROWDE and HODDER & STOUTON, 1914.

Hartenberg distinguishes "neurasthenia" from many of the conditions with which it is usually confused, such as phobias, impulses, hypochondriasis, anxiety neuroses, etc., although he admits that there are frequent complications of neurasthenia. The author correctly views neurasthenia as a state of general asthenia, psychic and physical, and among the more important exciting causes mentions overwork, chronic infections, digestive disturbances and emotions. Hartenberg realizes the important hereditary element as a predisposing factor, but it is rather disconcerting to find our old friend, "arthritic auto-intoxications," whatever this may mean, seriously discussed as a predisposing cause of neurasthenia. Freud's theories play no rôle in the causation or treatment of neurosis. Hartenberg's treatment in the main consists of psychotherapy of the Dubois variety, drugs for symptomatic purposes, electricity, hydrotherapy and rest. The Weir-Mitchell treatment as a consistent therapeutic policy is not mentioned. The book has a strong personal flavor, bordering upon the egotistic. This is so prominent in many places as to be irritating. The value of the work is marred by the absence of an index.

**Medical and Surgical Reports of the Episcopal Hospital in Philadelphia.** Volume II. Philadelphia: W.M. J. DOMAN, 1914.

This volume consists in a compilation of the various diseases treated and operated upon in the hospital, and a number of papers by its staff, based on the hospital's material. The paper by E. J. MORRIS, physician to the institution, is a very interesting commentary upon its growth between the year 1888 and 1912. From Frazier's paper, a review of 156 consecutive operations, one learns that there is a great diversity of surgical material at the Episcopal Hospital, and that the results of surgical treatment are excellent. Most of the papers have been published in other medical journals.

**On Dreams.** By PROF. DR. SIGM. FREUD. Only authorized translation by M. D. EDER. From the second German edition. With an introduction by W. LESLIE MACKENZIE, M.A., M.D., LL.D., medical member of the Local Government Board for Scotland, etc., etc. Duodecimo; 110 pages. New York: REBMAN COMPANY, 1914.

To those interested in Freud's theory of psychoneuroses, this book should prove of profound interest. It is well known that the interpretation of dreams, according to the analysis of Freud, forms the keynote to the elucidation of the cause of the psychoneurosis, so that a proper understanding of this subject is highly necessary. It is gratifying, therefore, that this essay, one of the most important and one of the most difficult to read in the original language, should be so ably translated for English readers.

**Diagnostische und Therapeutische Ratschläge für den Gynäkologischen Praktiker. (Diagnostic and Therapeutic Hints for the Gynecological Practitioner.)** By DR. ROBERT ASCH. Berlin and Vienna: URBAN & SCHWARZENBERG, 1914.

This small brochure is intended to give the practitioner doing gynecologic work practical hints as to the diagnosis and therapy of the more common ambulatory ailments.

## Progress in Surgery

A Résumé of Recent Literature.

**Ovarian Pain Due to Coitus Interruptus. (Coitus Interruptus als Ursache von Ovarialgien.)** A. HERZFELD, New York. *Zentralblatt f. Gynäkologie*, May 9, 1914.

Herzfeld, on the basis of observation of several cases, has noted that when *coitus interruptus* has been practiced for some time, women begin to complain of pain during the act and subsequently feel the same kind of pain in the ovarian regions on bimanual examination. The pains radiate toward the back or toward the appendix. Properly directed treatment brings about an amelioration of the pain very promptly.

**Placenta Previa and Its Treatment.** PROF. W. NAGEL, Berlin. *Surgery, Gynecology and Obstetrics*, July, 1914.

Nagel considers the various methods for the treatment of placenta previa, abdominal Cæsarean section, the extra-peritoneal Cæsarean operation, Dührssen's vaginal Cæsarean method, metreurysis and vaginal tamponade. He himself favors the Braxton-Hicks method of version and reports fifty favorable cases. He performs bipolar version as early as possible when only one or two fingers can be admitted, and brings down a foot, not distinguishing between the anterior or posterior, but seizing the most accessible one. When the os is only partially dilated, the leg must not be pulled down further than to above the knee, which will be sufficient to check bleeding. Should hemorrhage subsequently occur, when the os has become more widely dilated, the foot may be drawn down slowly until plugging is again complete. The expulsion of the fetus is left to nature, and an extraction is only justified when the os is fully dilated and the child is still alive.

Nagel's figures on the fifty cases compare very favorably with those obtained by the more radical methods.

**On the Pathology and Treatment of Chronic Leucorrhoea.** ARTHUR H. CURTIS, Chicago. *Surgery, Gynecology and Obstetrics*, July, 1914.

Curtis says that care of the general health, free elimination, and treatment of pelvic complications which predispose to mild local infection must not be overlooked in the care of chronic leucorrhoea. Bacteriological examinations have shown that treatment of the endometrium can usually be dispensed with. Occasionally, dilation for drainage is indicated. Douches, curettage and tampons are probably harmful. When glands of the cervix produce excessive mucous secretion, they should be destroyed by excision or by the cautery. Purulent discharges usually originate in the lower genital tract and bacteria of low pathogenicity, mainly anaerobes, are usually the active agents.

Autogenous vaccines cause a diminution of general malaise and backache. When associated pathological conditions are corrected, their action is usually beneficial. But some patients require constant administration of the vaccines, some are permanently improved, and a fair percentage appear to be cured. Vaccine treatment, combined with dry cleansing of the vagina and local applications of iodine, seems to give the best results. The author looks hopefully toward the perfection of therapy by means of the x-ray, radium or specific drugs.

**A Preliminary Report of an Operation for General Enteroptosis.** HIRAM N. VINEBERG, New York. *American Journal of Obstetrics*, July, 1914.

Vineberg's operation is modeled after Moschowitz's operation for prolapse of the rectum. Briefly it consists of the formation of a series of shelves of the peritoneum, beginning with the obliteration of the cul-de-sac of Douglas. With the uterus pushed down as far as possible, a fold of peritoneum is caught on either side and the two folds are sutured together by continuous suture. Three shelves are thus created one above the other until the pelvic cavity is completely closed off from above. The round ligaments are then sutured to the anterior parietal peritoneum to within one or two inches of the uterine insertion while the remainder of the ligament on each side is employed for fixation sutures to the abdominal wall according to the author's method. Vineberg reports three cases, all of which were greatly benefited by this procedure.

**Roentgen Diagnosis of Uterine Tumors by the Aid of Intrauterine Collargol Injections.** (*Roentgen Diagnostik der Uterus Tumoren mit Hilfe von Intrauterinen Collargolinjektionen.*) I. C. RUBIN, New York. *Zentralblatt f. Gynäkologie*, May 2, 1914.

Rubin has devised a method of injecting the uterus with collargol and of submitting the organ to the Roentgen ray for the diagnosis of the form of the uterus and for the determination of the presence of polyps and submucous fibroids. Although he has not yet tried the method on the human uterus he believes that it is free from danger and that entrance of the collargol into the peritoneal cavity through the tubes may be avoided by a regulation of the pressure used in injecting the drug.

**Retrodisplacements of the Uterus Following Confinement.** AUSTIN FLINT, JR., New York. *American Journal of Obstetrics*, July, 1914.

Flint has noted that retroversion of the uterus after confinement occurs much more frequently than is generally supposed. He urges more frequent examinations during the puerperium, and when a backward displacement is found, the institution of treatment. The results of early treatment while the uterus, including its ligaments, the vagina and the pelvic floor, are still subinvolved, are usually good, although the retroversion may be due to conditions existing before pregnancy began. The treatment consists of hot douches, the administration of ergot, and the assumption of the knee-chest posture. Tampons of glyceratannin are also useful, used every third or fourth day. After the sixth week a well fitting pessary should be inserted.

**Medical Versus Surgical Treatment of Pyloric Stenosis in Infancy.** L. E. HALL, New York. *Journal of the American Medical Association*, June 27, 1914.

Holt's experience includes fifty-seven cases, eighteen in private practice and the remainder in the Babies' Hospital. Pyloric stenosis in infancy presents many interesting and curious features. In the first place, it nearly always occurs in breast-fed infants and bad feeding can hardly be invoked as a cause. The predominance in the male sex is noticed by all writers. In the fifty-five cases of his own observation in which sex was noted, there were only six females. No explanation of this fact can be given. Pyloric spasm is frequently spoken of as congenital, but it is very rare for it to appear at birth or even in the first week. Only two of his cases appeared as early as the first week. In a great majority the symptoms begin abruptly, even the hour can be noted by the mother. The abrupt development of vomiting and other symptoms and their disappearance in a certain proportion of cases in a few weeks both point to spasm, but marked hypertrophy of the stomach has been invariably found at necropsies and it is to this hypertrophy that pathologists say the disease is due. According to this view the symptoms have an organic rather than a functional basis. Holt himself holds that definite, persistent spasm without hypertrophy is yet to be proved. The two elements, spasm and hypertrophy, are probably present in every case, but it is difficult to say which one is the cause of the other. The most constant and usually the first symptom is forcible and persistent vomiting. Gastric peristalsis is readily made out in most cases and a palpable tumor is usually found. One of the most valuable means of determining the pyloric obstruction and its degree is to measure the amount of gastric retention. The child is fed a measured quantity and the stomach emptied by aspiration three hours later. Holt advises Hess' duodenal aspiration apparatus for the purpose and considers this method better than the Roentgen ray. The constipation which follows is mechanical, due to the obstruction. As regards treatment the profession is divided. Physicians hold to the utility of the medical treatment and show statistics in its favor, while surgeons take the opposite view. The crux of the whole question is, whether the symptoms and conditions are such that the patient will not live long enough for the pathologic condition to subside. The general mortality has been accepted by writers as about fifty per cent. There are medical risks and surgical risks. The former are acute inanition or slow marasmus, the chance of intercurrent disease in the enfeebled child and of sudden death without apparent cause, as sometimes occurs. There is also a question as to whether complete recovery occurs under medical treatment or whether subsequent trouble may arise. The surgical risks are those of shock, nonunion, and exhaustion, which exist in every case. Then there are the accidental risks which will be lessened by experience on the part of the operator. In private practice with the best environment Holt believes many patients will recover without operation, but in more cases operation is the least risky. The patient gets well quicker and does not have the long-drawn-out recovery. The post-operative treatment is very important and Holt emphasizes four points: hypodermoclysis, feeding, castor-oil, and posture, the head being raised in bed which is inclined at an angle of 135° or more. Breast-milk is indispensable. The medical treatment for patients not operated on consists in careful feeding and stomach washing. The patient should be carefully watched and weighed daily.

**Pyloric Obstruction in Infants. A Report of Twenty-Two Personal Cases With Operation.** WILLIAM A. DOWNES, New York. *Journal of the American Medical Association*, June 27, 1914.

Downes reports his experience with twenty-two cases of pyloric obstruction in infants which have come under his care. Seventeen were males and five females. Eighteen were breast-fed entirely; two partly breast-fed, and two bottle-fed. In fourteen cases the patient was the first baby; in four the second; in two the third, and in two the fourth. The symptoms appeared in from three days to seven weeks after birth and in every case vomiting was the first symp-

tom. Constipation was marked in every case; except in four or five cases the babies were emaciated and in all there were the characteristic peristaltic waves of the stomach and the pyloric tumor was present. Beginning with the eighth case aspiration was a routine measure and in each stomach from one-half to four ounces retention three hours after feeding was regularly found. The operation showed the pyloric tumor without other lesions or malformations. With regard to the operation a few points are mentioned. "Ether should be the anesthetic used. The abdominal incision should be from one-half to three-quarter inch to the left of the median line. The reasons for this are twofold: In the first place there is so little subcutaneous tissue in these babies that there is difficulty in obtaining union in the median wound, whereas the incision through the rectus muscle heals much more readily. Many post-operative deaths have followed evisceration resulting from non-union in these cases. The second reason for placing the incision to the left of the median line is the avoidance of the round ligament of the liver. At necropsy in one of our fatal cases, a large hemorrhage was found just where the needle used in closing the abdominal cavity had punctured this ligament." A partial pyloroplasty performed in some of these cases consisted in making an incision one inch long through the peritoneum and circle muscle-fiber down to the mucosa. The edges of the wound gaped widely and the mucosa protruded. No effort was made to cover or close the incision, which immediately relieved the obstruction. Gastro-enterostomy should be the operation of choice, however, where the condition of the child is even fair and the partial pyloroplasty be reserved for cases where haste is the first need. It involves a risk to the mucosa and its future is uncertain. The after-care is extremely important and much depends on the judicious use of stimulants and the proper use of fluids by hyperdermoclysis and the Murphy drip, though these are not necessary when the patient is operated on when in good condition. From Downe's experience he feels justified in offering the following conclusions: "1. Hypertrophic pyloric is congenital to the extent that there is an increase in the thickness of the circular muscle-fibers at the pylorus. The presence of this thickened muscle-fiber reduces the lumen of the pylorus, and, therefore, the stomach, in order to empty itself, contracts more forcibly than normal. This abnormal contraction soon causes the mucus membrane to become thickened and edematous, and to assume a more or less spiral arrangement as it passes through the narrowed pyloric channel of from one-half to three-quarter inch. The result is a valvular action which gradually produces complete closure of the pylorus. The question as to whether or not the pylorus will admit a probe or catheter at operation or necropsy is of little consequence when weighed against the clinical evidence of complete obstruction. 2. There can be no doubt that there is sufficient time between the onset of symptoms and the appearance of the signs of complete obstruction, for careful observation and the carrying out of any medical measures likely to prove of benefit, provided, of course, that the early symptoms have been properly interpreted. The fear, however, that the condition may have existed longer than has been suspected, and that the vitality of the baby is not so good as appearances would lead us to believe, makes me feel that operation is indicated in every case of hypertrophic stenosis as soon as the diagnosis is made. Should depression or early evidence of shock be present, immediate operation is demanded. 3. The babies coming to operation in good condition suffer little or no shock; their convalescence is straightforward, and they are at once restored to normal health. My experience in this respect corresponds with that of other operators."

**Induced Pneumothorax.** E. A. ADELUNG, *Oakland, Cal.*  
*Journal of the American Medical Association, June 20, 1914.*

Adelung reviews the history of artificial pneumothorax, described by Forlanini and Murphy, and describes the apparatus and technic. The manometer is the guide to the work. He gives his own experience. The benefits of the operation are not always apparent at first, and symptoms may become temporarily aggravated; but after a few weeks the good results appear, as physiologic rest has been obtained. Pain from the operation is sometimes unavoidable

on account of the tension of lesions and the displacement of organs, but it is rarely of long duration and it is best minimized by gradual increase of pressure. Subcutaneous emphysema results from too much positive pressure. The spring pad hernia truss is often useful in alleviating it. Bleeding from the opposite lung is rare. Puncture of the lung is to be avoided, though it commonly causes little or no trouble. The most important accidents are pleural reflex and gas embolism, but only few deaths have been recorded. The distinction between the two is not clear, and some authors consider them to be identical. Clinically pleural reflex and gas embolism yield the same syndrome; fainting, pallor, convulsions, perhaps temporary or permanent paralysis and occasionally death. The Bauer incision seems to be, to some extent, a safeguard, and Saugman and some others aspirate before turning on the gas to see whether or not the needle is in a blood-vessel. Von Adelung says: "My conviction is that air embolism and real pleural reflex, such as results experimentally from the injection of irritating fluids into the sac, are both to be avoided by using warm, moist nitrogen, careful local anesthesia of the pleura and proper observation of the manometer. Not until the latter records free oscillations with persistent negative mean pressure can one feel sure that gas may be introduced safely, unless one is using the open method." There is much difference as regards cases appropriate for induced pneumothorax. Hemoptysis is controlled by the method and high temperature is not a contraindication. Natural pleural effusion acts the same way, but a small one may be aided by adding gas, thus inducing more complete lung rest. All writers agree that laryngeal tuberculosis is not a bar to the treatment. Pleuritic adhesions, if extensive, are a serious mechanical hindrance to the method. If slight, they may be broken down by gas pressure, if carefully applied, and perhaps sufficient free pleura may permit its use. If the patient is already dyspneic, unless it be due to a toxin, pneumothorax is irrational. Miliary tuberculosis is regarded as a contraindication, and so are serious cardiac disorders and marked splanchnoptosis. The main discussion is on how early artificial pneumothorax should be performed. Most writers advise it only in moderately advanced unilateral cases, but von Adelung thinks that careful study of the individual case should be advised. He follows Murphy in advising it in cases in which there is no absolute contraindication, and says that when it does not cure it often alleviates. He says: "My experience is limited to forty-two cases, all but one bilateral and well advanced. All but one were ambulant, the patients coming to the office for treatments. Of the forty-two cases it is noteworthy that pleuritic adhesions prohibited pneumothorax in only five. The total number of punctures done was over 614, and no gas embolism occurred; but pleuritic effusion supervened in six cases, one being purulent. Twenty-two patients gained weight and eleven lost weight, this observation being unrecorded in four cases. In thirty-seven cases in which a pneumothorax, even though small, was possible, twenty-eight patients were improved in varying degrees, one case was arrested (perhaps cured), and ten remained unimproved."

**Compound Fractures.** W. L. ESTES, *Bethlehem.* *Journal of the American Medical Association, June 13, 1914.*

Estes bases his remarks on the subject of compound fractures of the extremities on the following postulates: "1. In civil practice a compound fracture is always not only a solution of the continuity of a bone, but also a lacerated wound of the soft tissues in continuity from the periosteum to, and including the skin. 2. Violence necessary to produce a compound fracture of the bones of an extremity must be very great; hence the traumatism is extensive. Commonly the bone is comminuted and the laceration of the soft tissues very severe. 3. Compound fractures are practically always infected wounds. 4. The management of these injuries must include the treatment of a fractured bone and the treatment of a more or less extensive infected lacerated wound of the soft tissues of the same area." The general condition of the patient as well as the injury must be considered and the treatment should be adapted to the circumstances of each case. Stimulants, exclusive of alcohol, and analgesics are needed as well as



the control of hemorrhage. Estes advises the avoidance of tourniquets if possible. Elastic constriction is better and if tourniquets are used it should be at some distance from the injury. The wound must be protected aseptically and great care used to prevent infection by handling, etc. No attempt should be made to set the bone at this time. Careful fixation in the position assumed by the injured limb should be employed, unless it is clear that the ends of the fragments are so placed as to do damage. The first consideration of the surgeon should be what is best for the patient, taking into account what is best for his individuality, circumstances, and occupation, and what treatment will insure the least disability and give the best functional result; the constitution and environment have very important bearings. A compound fracture is almost always an infected wound, and Estes emphasizes the value of iodine for disinfecting soiled skin. Iodine is effective only when on a dry skin and hence it should be cleansed with benzoin or ether and carefully dried. The nature of the required operation is first to be considered. Amputation is indicated if there is three-quarters of the periphery over the fracture damaged so that it is liable to slough and the muscular tissues below are badly lacerated or comminuted. If there has been a circular or annular pressure on the whole periphery of the limb, or if the bones are comminuted or loose or have lost their periosteum so that practically three inches of the shaft is destroyed together with skin or muscle laceration, this also indicates amputation. The final condition of the limb is also important. Sometimes a limb can be saved which would be useless and often in the way, and the patient might prefer amputation. Conservation is sometimes more hazardous than sacrificing a part. If conservation is decided on, however, thorough cleansing and disinfection must be done, and an extension apparatus is often very useful for this purpose. As little direct manual manipulation as possible is advised. Direct fixation of the fragments is always best, and a rigid bone splint or plate is better than wiring. Certain metals are more or less bactericidal, and since 1886 Estes has used a Wessel silver plate and Wessel silver pegs to fasten the plate to the fragments. Vascular implantations and anastomoses are impracticable in these cases, but drainage is all important and it should be done in such a way as to avoid all tension and harmful pressure in the wound. When all these things are provided for a masse dressing of dry sterile absorbent material should be applied and should be left on for several weeks, and over all a gypsum splint with flexible strips worked into it should be placed so as to give support and elasticity to the dressing. When the dressings are removed it is his custom to remove the pegs and the plate if the wound is open to permit it; otherwise it can be left as it does not cause irritation. An analysis is given of fifty-one cases of compound fractures, and the results as regards disability, etc., are reported.

**The Value of Hexamethylenamin as an Internal Antiseptic in Other Fluids of the Body Than Urine.**  
F. HINMAN, Baltimore. *Archives of Instructive Medicine*, June 15, 1914.

Hexamethylenamin is not converted into formaldehyde in any of the normal alkaline fluids of the body; therefore it can be of no prophylactic value in any of these fluids. After some infections of these fluids there may be under certain conditions a change in reaction sufficient to produce a slight liberation of formaldehyde, but it is not possible to show that there would be enough to give antiseptics. In localized infections of pronounced acidity, hexamethylenamin is not taken into them from the circulation in amounts to furnish formaldehyde in antiseptic strength (the gall bladder, possibly, excepted). The therapeutic use of hexamethylenamin as an internal antiseptic is justified experimentally for urinary conditions alone, and then only when it is excreted into an acid urine.

**Hexamethylenamin.** H. MCGUIGAN and C. L. v. HESS, Chicago. *Archives of Internal Medicine*, June 15, 1914.

Since, after the administration of hexamethylenamin, free formaldehyde appears only in the gastric juice and acid urine, and not in other secretions or in the blood, even with dialyzing tests, the liberation results from the acid re-

action only and not from cell action. Even if it were liberated in other locations it would probably exert no beneficial action because of its reconversion or rapid acidation into injurious products. Combined formaldehyde as hexamethylenamin does not decompose readily until an acid medium is reached, when the action is that of weak formaldehyde. The only apparent indication for the internal administration of the drug, therefore, is in infections of the urinary tract.

**Cause and Prevention of Pyorrhea Alveolaris and Furunculosis.** F. TWEDDELL, Summit. *Medical Record*, July 4, 1914.

Following the recommendation of Reynolds in England, Tweddell reports his results in the above named conditions following the administration internally of dilute sulphuric acid. He reports "cures" of pyorrhea alveolaris and cases of furunculosis in which recurrences were prevented by this drug. It is given in thirty drop doses, which may be increased to fifty if necessary. Improvement is rapid and it is seldom necessary to continue treatment for more than eight or ten days.

**Pruritus Ani** JEROME T. LYNCH, New York. *Medical Record*, June 13, 1914.

For this usually intractable condition, Lynch recommends an operation based upon the procedure of Ball and Krause. In his own words, the description of the operation is the following: A point is chosen about one and a quarter inches from the anus. At this point a one per cent. solution of novocain or a one-fifth of one per cent. solution of cocaine is injected. An area extending to the posterior midline is anesthetized. At the point above mentioned a small curved incision is made, about one-half inch long, and extending just through the skin. Through this incision a blunt-pointed dissecting scissors, curved on the flat, is introduced, as shown in the illustration. With this instrument a blunt subcutaneous dissection is now carried out, working to the anus mesially, and to the raphe anteriorly and posteriorly. When completed there is an area of skin, extending from the anterior raphe to the posterior commissure and involving all the skin within a radius of one and a half inches from the anus, which has been deprived of its sensory nerves. Any bleeding may be controlled by pressure. When the bleeding has stopped a small piece of rubber tissue is introduced into the incision and permitted to remain twelve to twenty-four hours. Sometimes, in addition, a horsehair stitch is taken through the incision; but this is not usually necessary. As a rule, at the end of forty-eight hours the wound is entirely healed. Either at the same sitting or at some subsequent time the same procedure is carried out upon the other side. Lynch has operated thirty cases by this method and is well satisfied with the results.

**On the Possibility of Making a Collateral Excretion Channel by Interglandular Anastomosis Between the Parotid and Submaxillary Glands.** (Ueber die Möglichkeit, der Parotis durch interglanduläre Anastomose der Parotis, und Submaxillardrüse einer Kollateralen Exkretionsweg zu Schaffen.) G. FERRARINI, Pisa. *Zentralblatt für Chirurgie*, June 13, 1914.

The difficulty of healing parotid fistulae is well known, and is due to the fact that thus far there has been found no way to divert the parotid secretion into another channel. The author conceived that this might be possible by anastomosing the parotid gland to the submaxillary. This was done in a number of dogs and found to be successful, both functionally and histologically. Ferrarini suggests therefore the employment of this procedure in human beings.

**Painless Tumors of the Spinal Cord.** PEARCE BAILEY, New York. *Journal of the American Medical Association*, July 4, 1914.

Bailey calls attention to the fact that many cases of spinal cord tumor may pass unrecognized because of the absence of the symptoms of pain. That pain may be en-

tirely absent while the other symptoms are typical of spinal cord tumor is, he says, no longer open to question, and he reports a case which on account of its painlessness had long been regarded as one of Pott's disease. It was one of intramedullary sarcoma of the lower cervical and upper dorsal cord, of three years' duration. Laminectomy was performed, but the tumor could not be removed. The surgical recovery was perfect. Another case illustrating the fact that spinal cord tumors may escape diagnosis on account of the long intervals in which the pain symptoms are absent, is also reported. The lesion was in the cervical cord and had existed for eight or nine years, the motor symptoms gradually progressing, but the pain symptoms intermittent. Death followed operation. A third case of extramedullary psammoma of the upper dorsal cord, with no characteristic pains and with surgical recovery after the removal of the tumor, and still another one of intramedullary perithelioma of the dorsal cord, likewise without the characteristic pain, are also reported, and still others are mentioned. Bailey calls attention to the importance of early laminectomy in such spinal cases without waiting for the appearance of the characteristic pain referred to the site of the lesion. If this is neglected too long, as it was in some of the cases reported, the opportunity of giving relief may be lost. Out of twenty-four laminectomies performed in the Neurological Institute during the year ending November 30, 1913, there was only one death from the operation. In this it was performed for a suspected tumor of the cervical cord, a very risky location. In view of this slight mortality he feels less hesitation in recommending a more general resort to the operation.

**Malignant Tumors of Bone.** A new method in conservative operative treatment. PROF. R. WENGLOWSKI, Moscow. *Lancet*, May 16, 1914.

The present "conservative method of treating malignant tumors of the bones is by resection in continuity and replacement by pieces of living or dead bone. Wenglowski modifies this principle by merely removing the tumor in the soft parts and killing the affected piece of bone by the aid of steam. This is done by attaching a perforated metal tube to an autoclave or an ordinary steam kettle and applying the steam directly to the bone for varying times. The author has found by experiment that to heat the tibia to a temperature of 75° to 80° C. long enough to kill all cellular elements, three minutes are sufficient; for the lower mandible, one and one-half minutes; the femur, eight minutes, etc. To protect the surrounding soft tissues, the author covers them with gauze, a metal plate, and asbestos. To heat the posterior aspect of the bone, the author has devised a special curved flat tube. The advantage of this method over that in use at present is that the continuity of the bone is preserved.

**Pseudarthrosis Produced by Interposing Sheet Silk and Bayberry Wax.** R. O. MEISENBACH, Buffalo. *The American Journal of Orthopedic Surgery*, 1914, No. 2.

Although a preliminary report based on few cases, the article should be reviewed because it suggests a possible solution of the treatment of ankylosed joints. Fine China silk, impregnated with bayberry wax (after its preparation by the Lange method for silk tendons) is interposed between the joint surfaces after the necessary operation for their separation has been practiced. The silk is merely employed as a support for the wax. Bleeding from the bone is controlled by the same wax. The object of the author's technic is the interposition of a permanent, non-irritating, fatty material. Of the four cases reported, the results are good in two, and the other two are still under observation.

**Paravertebral Conduction Anesthesia.** *Die Paravertebrale Leitungsanästhesie.* P. W. SIEGEL, Freiburg. *Deutsche Medizinische Wochenschrift*, July 9, 1914.

Sellheim and subsequently Laewen, Finsterer and Kapis demonstrated the practical possibilities of inducing anesthesia for abdominal and pelvic operations by injection

of the anesthetic fluid into the sensory nerves at their exits from the intervertebral foramina. Siegel now reports 170 gynecological and obstetric operations in which paravertebral anesthesia was practiced, and describes the technic of administration, the indications and sequelæ. In 70 per cent of his cases the anesthesia was sufficient; in the remainder a minimal amount of inhalation anesthesia was necessary. Any post-operative effects that were encountered could be attributed to the operation itself. The author advocates a widespread trial of the method.

**Local Anesthesia for Prostatectomy.** (*L'Anesthésie Locale de la Prostatectomie.*) F. LEGUEN, Paris. *Journal d'Urologie Médicale et Chirurgicale*, June 15, 1914.

The author does not approve of the two-stage operation of prostatectomy, the first stage under local, the second under general anesthesia. He has had uniformly successful results in the last sixty prostatectomies by using the following technic: Novocaine-adrenalin is employed. After the abdominal wall has been anesthetized and incised in the usual manner the bladder wall is thoroughly infiltrated. The bladder itself has been previously filled with a dilution of the anesthetizing fluid. The bladder is opened and two fingers are carefully introduced to the prostate. With these as guides the line of cleavage about the prostate is thoroughly saturated by the anesthetic. The latter is introduced through long, specially prepared needles; the fluid should run readily into the periprostatic zone, otherwise the needle has been introduced into the prostatic tumor. The urethra is infiltrated where it is to be torn through.

Prostatectomy can then be painlessly performed and complications from the anesthetic have not, as yet, been encountered.

**The Effects of Heliotherapy Upon Tuberculous Fistulæ.** (*Die Einwirkung der Sonnenstrahlen auf Tuberkuloese Fisteln.*) E. KIRSH, Berlin, and H. GRAETZ, Leysin, Switzerland. *Archiv fuer Klinische Chirurgie*, Vol. 104, Part II.

Rollier's assistant has joined the assistant of Bier in Berlin in a careful study of a small group of tuberculous fistulæ treated by the sun's rays. The results were as remarkably good as those reported by Rollier. Fistulæ from tuberculosis of the soft parts heal very rapidly (four to six months), and the underlying foci of disease also heal in that time. Tuberculosis of bones and joints presenting fistulæ take about one year to heal. All the cases showed complete healing except when the x-ray demonstrated an active tuberculous focus.

The process of healing and its early stages are described by the authors. The object of reviewing the article in these columns, however, is to call general attention to the epoch-making work of Rollier in the field of surgical tuberculosis.

**Chronic Intestinal Stasis—"Autointoxication" and Subinfection.** J. G. ADAMI, Montreal. *The Proctologist*, June, 1914.

It is clearly shown by Adami that so little is known of the nature of intestinal absorption of toxic material that the term "autointoxication" should be dropped by "any self-respecting member of our profession." He suggests the term "subinfection," for it has been demonstrated that the mesenteric lymph-nodes take up the bacteria, pathogenic and otherwise; that the bacteria are destroyed in the lymph-nodes or in the viscera drained by the lymph-nodes, and that suppurative foci do not develop, but that symptoms appear from the liberation of the toxins of the bacteria. Adami does not deny that the indol group plays a part in the picture of intestinal stasis. He makes most vigorous argument, however, against acceptance of the theories advanced by Lane in favor of side-tracking or removing the colon for one or all of many manifestations that may have no bearing upon intestinal stasis. By discovering the cause of the symptoms a more appropriate method of treatment will be instituted.

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## THE COLLICULUS SEMINALIS CONSIDERED AS A FACTOR IN CHRONIC DISEASE OF THE MALE URETHRA

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Since the invention and perfection of the posterior urethroscope, our methods of diagnosis and treatment have grown apace with the added information that we are now enabled to obtain through the use of this instrument. Whatever style of instrument is employed we are enabled to see for ourselves, to a greater or less degree, the actual pathologic conditions, and in a somewhat limited manner, local treatment may be applied under the control of the eye.

These changes in diagnostic and therapeutic methods necessitate a radical modification of the hitherto prevalent views concerning the causation and medication of the chronic diseases of the posterior urethra. As a result, it may safely be stated that the urologist who does not employ this valuable medium in the management of chronic urethral conditions, is, to say the least, not fair to his patient.

Especially is this true as far as the colliculus is concerned. The urethroscope has certainly demonstrated beyond the shadow of doubt that many obstinate and even incurable lesions involving the deep urethra are due solely to an involvement of the colliculus seminalis or verumontanum. Many of these cases have hitherto been considered in the light of a chronic inflammation of the prostate or seminal vesicles; careful examination, however, reveals the interesting fact that inflammatory disease of the colliculus, chronic in type, may simulate in a very great measure the chronic inflammatory lesions of the prostate and vesicles.

The symptoms of this condition are too numerous to be mentioned in a brief communication. They vary in different individuals; there is no particular symptom that might be considered as pathognomonic of colliculitis, notwithstanding the fact that when several symptoms are found jointly in one patient, the diagnosis is not at all difficult. Probably the most frequent symptoms based on uncomplicated colliculitis *per se* are premature ejaculation of semen and partial or complete impotence. In my experience, these symptoms occasionally coexist, and when

the colliculus is examined with the urethroscope, we find it more or less congested, swollen, bleeding easily and at times very tender to the touch of the instrument or the applicator.

Another class of patients presents the typical symptom of frequent diurnal micturition; these men are usually highly neurasthenic, constipated, anemic, underfed and poorly nourished. Gonorrhea may or may not have preceded the urinary frequency. Here again, we find a marked inflammation of the colliculus and its adjacent parts. Cysts and polypi are not infrequently observed in these cases, not only on the colliculus itself, but also on the roof of the urethra, immediately anterior to the internal sphincter.

Defecation spermatorrhea is usually ascribed to prostatitis; in a case that came under my observation, however, I found the colliculus large, turgid and congested. The prostate appeared to be quite normal, and so were the vesicles. Topical applications to the colliculus brought about a rapid disappearance of the spermatorrhea and thus confirmed the diagnosis. In this particular case the cure has lasted two years.

Shreds in the urine, a mucoid discharge from the meatus or an apparent inability to empty the urethra of the last drops of urine are frequent complaints made by patients who are found to suffer from collicutis. The last symptom is an especially common one in the neurasthenic and asthenic patients previously mentioned; but it responds readily to treatment.

By a strange coincidence, it has been my fortune to see three cases within the last week, in which all the patients presented the single complaint, sterility due to azoospermia, without any history or evidence of gonorrhea or of epididymitis. The patients were strong, young, healthy married men, one of them stout, the others of normal weight; the sexual function was in no sense disturbed. The prostate, seminal vesicles and the external organs were apparently normal. Examination of the fresh seminal secretion showed an utter absence of spermatozoa. However, the examination of the posterior urethra showed the following striking conditions:

CASE I. (See Fig. 19). Colliculus highly congested, the anterior aspect deep red, like a fiery ball; from its upper surface, emerged five bands of fibrous tissue, which extended backward along the

floor of the prostatic fossette toward the vesical neck. At first sight, these bands gave the impression of a trabeculated bladder, with the difference that there was no crossing of the bands, all of them radiating outward like an opened fan. The ejaculatory ducts could not be discerned.

CASE II. (See Fig. 20). A very highly inflamed colliculus, the base deep red, streaked with white and gray, and bleeding easily when touched with a probe or cotton carrier. From its anterior surface, a cauliflower-like polyp arose, behind which could be seen the outlines of a large cystic mass. Ejaculatory ducts could not be found.

CASE III. (See Fig. 21). A large deformed colliculus, utterly obscured by innumerable large and small cysts; total cystic degeneration; when punctured, some of these bodies gave forth a creamy white cheesy substance, which dissolved readily in the irrigating fluid. The ejaculatory ducts not visible.

It must appear that in these instances, the conditions which caused these great changes in the colliculus, must also have obliterated the ejaculatory ducts.

When we study the etiology of this condition we find that gonorrhea is a frequent but not an essential factor in its causation. As a matter of fact, I see perhaps as many cases of colliculitis without a previous gonorrheal history as with such a history. In nearly all cases, however, whether of gonorrheal origin or otherwise, some form of sexual excess or abuse may be observed. Masturbation, excessive coitus, excitement without gratification are commonly present; in fact, the diagnosis of masturbation may often be made by the enormous hypertrophy which the colliculus undergoes as a result of this practice. I believe that Luys first called attention to this feature some time ago. It is also interesting to inquire in this connection, whether we are dealing with a vicious circle—that is, whether the colliculitis is the cause or the result, or perhaps both, of these sexual disturbances. In most cases it is difficult to answer this question. The same is true of those instances in which a lukewarm individual suddenly or gradually assumes a sexual passion almost beyond restraint or control. A congested colliculus is invariably associated with this condition—whether as cause or effect, I cannot say.

My experience leads me to believe that the colliculus is an important factor in transforming a mild and tractable gonococcus infection into a stubborn and well-nigh incurable process. This is especially true when the colliculus has been the seat of chronic inflammation, and now has superimposed on it an acute gonococcus infection. When we look back on our anterior urethritis cases that have gone along well for two or three weeks, and then suddenly

develop a posterior involvement without any apparent inflammation of the prostate or seminal vesicles, and that are characterized by an unusual obstinacy and resistance to treatment, it seems quite likely, in the light of our new knowledge, that we have had to deal with an acute inflammation of a chronic colliculitis, pure and simple. Such a diseased colliculus surely offers a favorable nidus for the growth and development of the gonococcus; it is therefore quite certain that this little organ plays an important rôle in favoring the extension of the inflammatory process to the prostate and seminal vesicles. I have often thought of this little structure, in this connection, as a glandular oasis in the comparatively desert-like posterior urethra, which, as is well known, offers but a poor soil for the growth and development of the invading gonococci.

The pathologic changes which the colliculus undergoes in the course of these diverse inflammatory processes are quite numerous and varied. Thus we find erosions, granulations, polypi, cysts, papillomata, excrescences, vegetations, hypertrophy, simple congestion, swelling and deformities of various types.

In many instances, however, especially in the gonorrheal variety, the glandular orifices running along the sides of the colliculus are also involved in the general process. I have succeeded, at times, in expressing pus through these orifices by massaging the prostate, by rectum, with the instrument *in situ*, and the pus could be seen exuding through these little slits in much the same manner as the thicker stream of pus enters the bladder from the ureteral orifice in a case of surgical kidney. To be sure, the prostate must be large, soft and boggy to lend itself kindly to this procedure. On the other hand, if these orifices are narrowed or entirely occluded by the inflammation, they act as a bar to the proper drainage of their glandular ducts; it therefore becomes essential to enlarge these orifices, either by dilatation or cutting, and in this way provide suitable drainage for these infected glands. This method, properly applied, will often bring about relief and even a total cure in otherwise incurable cases.

The close anatomic and physiologic connection between the colliculus and the seminal vesicles need not be dwelt on. French writers speak of the utricle as the "mirror of the seminal vesicles," because of the possibility of determining the pathologic state of the vesicles by the picture presented by the utricle. In this respect the analogy between the utricle and the ureteral orifices is very striking. Just as the ureteral orifice mirrors the conditions existing in the kidney and ureter, so we can study the seminal vesi-



Fig. 1.

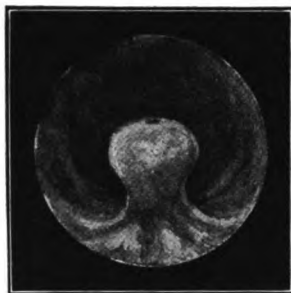


Fig. 2.

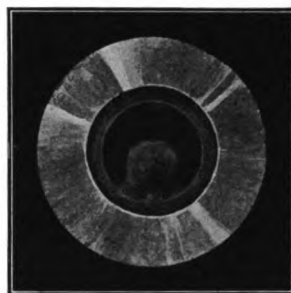


Fig. 3.

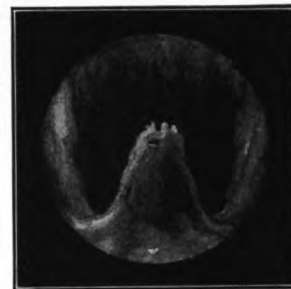


Fig. 4.



Fig. 5.



Fig. 6.

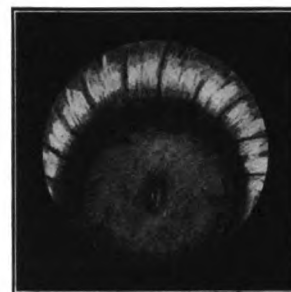


Fig. 7.

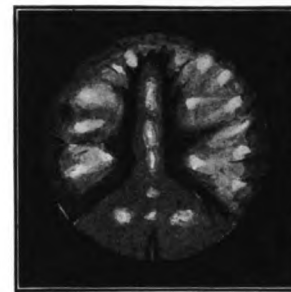


Fig. 8.



Fig. 9.



Fig. 10.



Fig. 11.

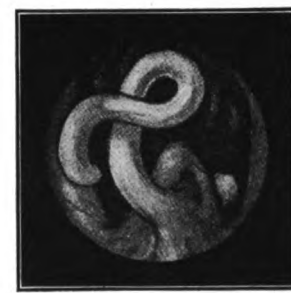


Fig. 12.



Fig. 13.



Fig. 14.



Fig. 15.

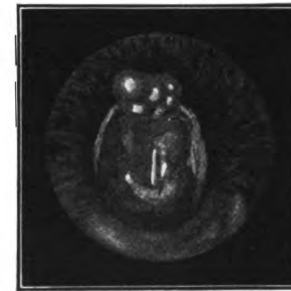


Fig. 16.



Fig. 17.

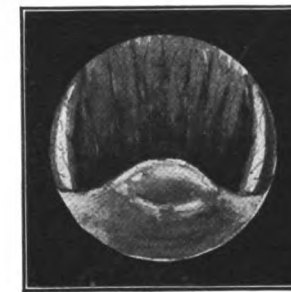


Fig. 18.

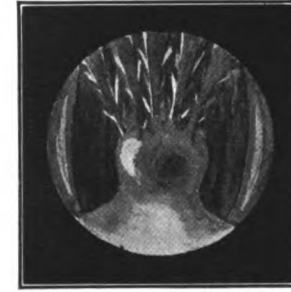


Fig. 19.



Fig. 20.

cles by observing what changes have taken place in the utricle, because this little body is invariably involved in sympathy with an inflammation of the vesicles. As a rule, in the normal case, the colliculus is not highly sensitive to touch; when, however, it becomes acutely inflamed, as in acute posterior urethritis, it is not only sensitive, but actually painful, at times, and this is made evident by the frequency of nocturnal emissions, which are often accompanied by severe pain. In the chronic state, the tenderness often persists, and posterior urethroscopy is thus rendered impossible without the employment of a local anesthetic. The slightest touch of the examining instrument causes a great deal of pain, at times, which persists as long as the instrument lies in contact with the organ.



Fig. 21.

We may go a step farther in this direction. As a result of our better technic and superior instruments, we can now catheterize the ejaculatory ducts, in the hope thereby of bringing our therapeutic attack to bear on the diseased vesicles. Particularly in this therapy indicated in cases of vesicular retention, that is, when stripping and massage of the seminal vesicle fails to empty the sac, because of occlusion of the corresponding ejaculatory duct.

It has been suggested that it may even be practicable to apply medication to the ejaculatory ducts and the seminal vesicles by means of a fine catheter inserted into the orifices of these ducts. I have not had sufficient experience along this line to say what merit the suggestion possesses, but I feel quite certain that in the course of time this will become as practicable a procedure as catheterization of the ureters and lavage of the kidney pelvis.

Catheterization of these ducts will also be of value in cases presenting painful and bloody ejaculations, and in almost all types of chronic spermatocystitis. It goes without saying that intervention of this kind should never be employed in acute conditions of the lower urinary tract; it should be reserved for chronic conditions, particularly after the colliculus and the adjacent parts have been well studied and the diagnosis fully made.

Concerning the treatment of colliculitis and the technic pertaining thereto, suffice it to say, for the present, that the field is a new one and that the methods are still in their embryonic state. Enough has already been accomplished, however, to warrant the statement that with the aid of a suitable posterior urethroscope and sufficient experience on the part of the operator, striking results are obtained in the alleviation of chronic conditions that have heretofore been considered almost hopeless.

113 East Nineteenth Street.

#### LEGENDS FOR ILLUSTRATIONS.

- Fig. 1. Dome-shaped colliculus (normal).
- Fig. 2. Door-knob shaped colliculus (normal).
- Fig. 3. Same as Fig. 2. Seen with the simple straight tube, unmagnified.
- Fig. 4. Normal colliculus, summit flattened.
- Fig. 5. Cone-shaped colliculus (normal).
- Fig. 6. Fungus-shaped colliculus (normal) (Wossidlo).
- Fig. 7. Hypertrophied colliculus; suggestive of chronic masturbation (Luys).
- Fig. 8. Phallus-shaped polyp arising from the apex of the colliculus.
- Fig. 9. Colliculus covered with small cysts.
- Fig. 10. Large colliculus covered with papillomata (Wossidlo).
- Fig. 11. Pointed colliculus with multiple cysts on the roof of the urethra directly above.
- Fig. 12. Colliculus with long sausage-shaped cyst anteriorly and small cyst posteriorly.
- Fig. 13. Same as Fig. 12, after both cysts were punctured and removed; slight traces visible.
- Fig. 14. Fine stream of pus exuding from left ejaculatory duct, upon massage of prostate, with instrument in situ; the pus is being washed backward into the bladder by the flow of the irrigation fluid.
- Fig. 15. Solitary cyst of colliculus; the only abnormal lesion visible in a case of total impotence in a man, aged 25 years; negative venereal history.
- Fig. 16. Polyp on summit of colliculus (Luys).
- Fig. 17. Ulcerated and deformed colliculus (Wossidlo).
- Fig. 18. Same as Fig. 17, after treatment.
- Fig. 19. Congested colliculus with fibrous bands emerging from its substance and extending backward toward the vesical neck; orifice of ejaculatory ducts not visible; azoospermia.
- Fig. 20. Highly inflamed colliculus, with red, bleeding base, from which emerge a cauliflower polyp anteriorly and a large cyst posteriorly; ejaculatory ducts not visible; azoospermia.
- Fig. 21. Large deformed colliculus, with universal cystic degeneration; when punctured these cysts contained a cheesy material which easily dissolved in the irrigation fluid; ejaculatory ducts not visible; azoospermia.

#### THE TRAINING FOR SURGERY.

To become a useful surgeon the candidate, after graduation, should spend at least eighteen months as an interne in a hospital having a well-trained and organized attending staff. The hospital training should cover general medicine and surgery, including their subdivisions, and a course in anesthetics must not be neglected. The hospital training forms the nucleus for the further development in either medicine or surgery, or the specialties. After completing the internship one should serve as assistant to a surgeon of known ability, devoting a reasonable amount of time assisting at operations. Assisting more than three hours daily in actual operative work deprives the assistant of too much energy, for he must devote study to the patient, case histories, reviewing the surgical literature, and devoting not less than two hours each day to laboratory anatomy and pathology. Six hours weekly should be given to experimental surgery upon animals.—H. W. WIGHTMAN in the *Medical Record*.



## WOUNDS AND THEIR TREATMENT.\*

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The art of medicine is based on the notion of how Nature *should* work, and the science of medicine on an accurate knowledge of how Nature *does* work. And he is more uniformly successful in his results and happier in his conceit who studies Nature and the methods employed by her.

In a primer of surgery we find wounds described and classified. In the first-aids we find their treatment outlined. To our dispensaries and our under-studies we relegate them. But wounds should not be divided, for all types exist as one. Every wound is a laceration—a bruising—the damage extending, perhaps minutely, in all directions. Individual cells and tissues in the line of injury are shredded, disturbed in their relations. They are shocked, devitalized, and rendered incompetent to carry on their individual physiological life-work. Their nutrition is interfered with. Further, the lymph spaces are opened; the bloodvessels severed, with a pouring out of lymph and blood. The same act which tears the tissues forces into the wound foreign bodies, dead epidermis, with germs attached thereto. Thus we have in a wound when closely examined a combination of conditions demanding an intricate and elaborate process for prompt and complete healing.

All healing is inflammation. To comprehend we must know the methods of repair in all forms of life. In the more primitive, the non-vascular, where there is an external membrane, a digestive canal, and an intervening fluid containing leucocytes, all injuries are corrected by the leucocytes passing to the point of injury and filling up the space until such time as the external membrane through cell multiplication can restore itself. All through the animal kingdom up to those animals having a vascular system we see the leucocytes, obeying the call of chemotaxis, pass to the injured spot and not only promote healing, but protect the part before and during this process. Metchnikoff, impressed by this leucocytic action, concedes it the most important of all.

In the vascular animals the bloodvessels dilate, pouring out blood, and the cavity is filled, with the added advantage of anti-bodies in the serum. In twenty-four hours from the time of injury—yes, immediately after—the body cells and leucocytes undergo mitosis and proliferate. Even the lower cells of the epidermis send out prolongations, and if the opposite edges of the wound co-apt, they interlace and we have a union between this por-

tion of the integument. In man the vascular changes are important. The congestion and infiltration of the surrounding tissues with the white cells act as a splint to immobilize the traumatized portion and give rest. The proliferating healthy cells detach those that are devitalized and gradually separate them from their connections. This is the inflammatory process of John Hunter.

Not until the researches of Ross and Cropper did we understand how all this is brought about; why it is that wounds heal. Their researches have shown that although the white cells have never been seen to proliferate elsewhere, they are doing so actively at the points of inflammation. Through their experiments it was discovered that the products of cell death, xanthin and creatin, and a degenerative product of the blood, globin, are the auxetics for cell division, leucocytes and body. Immediately after an injury is received tissue death begins. Products of decomposition are formed, acting as a powerful chemotactic to cells and a true stimulant to tissue proliferation. The leucocytes are drawn into the wound, actively dividing and proliferating. The fibroblasts also appear and the tissue cells of the body divide and take on their several embryonal functions. Some will send out long pseudopodia which become canalized, forming bloodvessels. Others will mass around the same leading to the formation of granulation tissue.

Fresh blood serum inhibits cell-division, but decomposed blood serum, liberating globin, stimulates it. Civilization is the Dance of Death, the fiddler being satisfied by somatic association with microbes, and irregular tissue growth. The ever-present microbe is with certainty forced into every wound and one beneficial effect upon the same is the rapid destruction of devitalized or helpless tissues, with an equally rapid formation of auxetics, there being putrefactive bacteria that do not produce pus.

Nature also provides other auxetics formed in the system, suprarenalin, the amino-acids, cholin and cadaverin. Some of these aid in the healing of wounds, others tend to produce a cell proliferation which is irregular and may thereby form the first stages of tumor growth or even carcinoma.

The inflammation of healing is not a deleterious process, but is Nature's effort at repair. As was said before, the vascular changes are the most noticeable in the higher order of life, but the chemical and mechanical action of the exudate plus the products of secretion from the microbes with the disintegration of devitalized tissue, is the most important part of the process. The leucocytes exert a phagocytic action on the debris and fibrin in ad-

\* Read before the New York and New England Association of Railway Surgeons, October, 1913.

dition to the proteolytic effect of their enzymes. Even the somatic cells take on an amoeboid movement and become phagocytic, assisting in the process.

By the third day the proliferation of cells is at its height and capillaries are budding. The fibroblasts produce their striae, these interlock, gradually the cell diminishes, the striations become more abundant and cicatricial tissue is formed. Suppurative inflammation in a wound is the result of a profound attraction of leucocytes to the area of injury without disintegration. Healing is not due to any inherent propensity. It is always brought about by the action of auxetics. These auxetics develop through tissue death. So it is that "through death we live." The physiological auxetics of the body stimulate normal body growth; the pathological auxetics, the result of irritation, particularly when there is excessive alkali, induce irregular cell proliferation.

Healing is a chemical process, and, not unlike all Nature's emergencies, the work is at first physiological, then pathological. The profound attraction of white-cells ends in an excess and pus is produced. Vascularization extends beyond normal limits with pain and tenderness. The all-important serum becomes impotent, favoring infection.

Healing, it will be seen, has three stages: at the time of injury there is a hemorrhage, which is a flushing process tending to dislodge and remove foreign matter and entering germs; then, come the leucocytes which dissolve and devour dead tissue and that which is being sloughed off; the third stage is one of hyperemia, bringing in the serum and filling up the interstices.

The logical treatment of wounds is to assist Nature, and not in any way interfere with her workings. For all art is idle that is not based on a scientific and precise knowledge of that which is inevitable.

In the treatment of the first stage, the only call to which the physician is able to respond is the elimination and control of the entering microbes. Nothing should be done which tends to force them deeper into the tissues. No technic is correct which through cleansing of the neighborhood allows of the introduction of more germs. Irrigations with antiseptics and bactericides are risky because of the tendency to open up spaces and diffuse rather than cleanse out. Most antiseptics are as injurious to body tissue as to micro-organisms, but we have two substances which disturb cell life very slightly and yet have a strong potent influence on the germs, namely, tincture of iodine and solution of potassium mercuric iodide. With the latter we have had little

experience, but experimentation seems to indicate that it is a preparation reliable as a germicide and not dangerous to tissue cells. In tincture of iodine we have that which is almost a type. It is a halogen, that is, a substance rather closely allied to the colloids. It does not damage the wounded surface materially; it is actively bactericidal and through its local stimulating effect tends to bring into the wound the serum and its contents.

On February 7, 1910, Miss Y., a patient of Dr. Dinglestedt's, fell and suffered a compound fracture of the leg. The tibia was pushed through and a fragment broken off. She was removed to St. Mary's Hospital, Hoboken, where she was seen by me. There was a wound about 4 cm. in diameter with the tibia protruding. Under anesthesia reduction was made and after careful cleansing of the skin, with the stoma protected, the cavity was injected with over an ounce of tincture of iodine. Gauze was placed on the wound and kept soaked with 50% alcohol for three days. At the end of this time the gauze was removed and the cavity again injected. At the end of nine days the cavity had filled and the external wound was closed. She had no discharge of pus from the cavity during this time and the compound was quickly changed to a simple fracture.

Encouraged by this unusual result since that time all compound fractures have been treated in a similar way with an equally good result. If the case is not seen in time to give the patient this type of treatment promptly, the wound may then go on to the second stage, that of superficial necrosis—necrosis of the fascia—associated at times with more or less extensive gangrene, the phagocytes actively working to separate detritus through lysis and phagocytosis. The system is being protected by the sloughing-off process. Germs are growing actively, and through their toxins tend to inhibit the anti-bodies and kill off the phagocytes.

We have in simple yeast another organism of the same type as the bacterial micro-organisms, but of a somewhat higher grade in life, consequently with a more vigorous hold on life, stronger enzymes, and deadly to the microbe. The relation of yeast to the microbe is the same as the microbe to the white cell. The ferments of the yeast are proteolytic. As the end products in yeast life are the nascent lactic and succinic acids and alcohol, we have very potent anti-putrefactives. These are also actively bactericidal. The yeast plant is a passive phagocyte. It does not actively grasp the germ, but yeast cells are discovered full of germs and the enzymes in the plant inhibit them.

Yeast is also chemotactic. It induces leucocytosis and stimulates the functions of the white-cells. It has the same chemotactic power over the microbes that they have over the leucocytes. It is especially

valuable in the streptococci and bacillus coli condition, but in the presence of the proteus or the pyocyaneus it is not quite as effective.

An emulsion, as thick as possible, of Fleischmann's yeast cake in sterile water, with a pinch or two of sugar added, injected into a wound that is sloughing and not thoroughly granulated, the superabundant part of the suspension allowed to remain, will, if done with frequency, have a most astonishing effect in cleansing out the wound.

Mr. G., a patient of Dr. Steadman's, in November, 1911, had cholecystitis with gall-stones, associated with 4% sugar in his urine. There being regional peritonitis, operation was compulsory and he was removed to Christ Hospital, Jersey City. On the third day after the operation his wound broke down. Gangrene of the margins and of the fascia started on. He became apathetic—slid down in bed. Showed evidences of beginning infection. His condition seemed desperate. He was irrigated with iodine solution without benefit, when the value of yeast was thought of. He was irrigated with it and some of the yeast plant, softened with a small quantity of water, was packed into the wound. In twenty-four hours an improvement was noted. In a few days his wound cleaned up and the case ultimately recovered.

When a wound has been cleaned of all detritus and the healing is yet slow, we may feel confident that the blood does not reach the surface in order to continue the healing process. Nature's response to the demand for leucocytes has been over bountiful, more came than were needed, and pus is formed. The walling of leucocytes and fibrin largely prevents the influx of serum and healing comes to a standstill. More blood must be brought to the surface. Wright cleverly came to the conclusion that the local application of citrated saline solution might be effective. He made up such a preparation in the strength of 2% salt and ½% citrate of sodium, the object being to dissolve out the fibrin and unnecessary leucocytes. The wound in this case being in a condition of a choked-up filter. This preparation cleans out and allows the serum to percolate through. For several years this measure has been employed in conditions of indolency, sinuses and open wounds. The result has been most pleasing. Proper granulations form, though vascularization takes place, tissue growth continues, the skin grows out from the margins, and the wound rapidly heals.

The stimulating effect of blood in the healing of wounds has been utilized of late in the case of ununited fractures. If an ounce or so be taken from the patient's veins with a syringe lubricated with liquid albolene and injected down to the point of fracture, the delayed callous is often thrown out, with resulting union.

## SURGICAL CONSERVATION OF THE OVARY.\*

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Considering the voluminous literature upon conservative surgery, which has been greatly augmented during recent years, the practical absence of reliable clinical data relating to resection and conservation of the ovary seems surprisingly strange, certainly there exists no feature of greater importance within the domain of operative gynecology than the preservation of the child-bearing function of womanhood, which is oftentimes possible by a thorough understanding of conservative principles when surgical intervention is undertaken for the relief of pelvic lesions.

Careful study of the after-effects in many cases in which mutilating operations were performed upon the uterus and its adnexa induces the inevitable conclusion that radical surgery is not always productive of permanent relief. On the contrary, there is abundant evidence to prove that such operations are sometimes followed by symptoms of greater gravity than those for the relief of which surgical intervention was originally undertaken. "It is but a few years ago that for the most trivial reasons the ovaries were sacrificed. The unthinking and rash way in which those who posed as specialists in the diseases of women operated upon and removed organs which did not conform to some ideal in structure which the operator had adopted, very justly brought the specialty of gynecology into disrepute. A better knowledge of the physiology and of the pathology of diseases peculiar to women has brought about a most radical change in our views regarding the propriety of removing the ovaries and tubes." Not many years ago it was quite a common practice to extirpate practically normal ovaries under the mistaken assumption that various nervous phenomena exhibited by the patient might be thereby benefited and perhaps permanently cured. Fortunately such surgical fanaticism is now comparatively rare, since it has been conclusively demonstrated that the nervous disturbances were almost invariably increased by double oöphorectomy, in some instances acute mania being the logical outcome.

Study of the statistics shows the tremendous importance of the distressing after-effects of double oöphorectomy. For example, Giles observes that flushes and symptoms of artificial menopause persisted three to four years and in some instances ten

\*Portions of this paper were read before a meeting of the Jefferson County Medical Association, of Louisville, Kentucky.

years. Severe mental depression occurred in ten to thirty-three per cent. of cases. Of 157 patients subjected to double oöphorectomy, two became violently insane. Sex instinct was entirely abolished in over sixteen per cent. Reviewing the results of one thousand celiotomies, of which fifty were unilateral salpingo-oöphorectomy for pelvic inflammatory lesions, Giles concludes that even the extirpation of one ovary may cause distressing irregularities, e. g., there was diminution or cessation of menstruation in sixteen per cent. of the cases, and in twelve per cent. the sexual desire was lessened or entirely abolished. The observations of Norris show that of 133 cases in which one ovary was removed, menstruation was diminished or irregular in fifty.

Statistics of other operators show even more disastrous after-effects of double oöphorectomy. For instance, the observations of Sherwood-Dunn in one hundred cases where both ovaries were extirpated indicate the following results: 78 per cent. subsequently suffered notable loss of memory; 60 per cent. became more irritable with "violent and irresponsible fits of temper;" 42 per cent. suffered from mental depression, 10 per cent. being so depressed as to verge upon melancholia; in 75 per cent. there was a diminution in sexual desire, and some of these claimed they experienced no sexual pleasure; 13 per cent. were not relieved of pain and other symptoms; 35 per cent. increased in weight, and some became abnormally fat; some complained of a diminution in the acuity of vision; 12 per cent. had change in voice to a more masculine quality; 15 per cent. suffered from irregular attacks of minor skin disorders; 25 per cent. had severe headaches; equally as many complained of nightmare; 5 per cent. suffered from insomnia; in a few cases there existed a sexual hyper-excitability not present prior to the operation.

According to Martin the physiological value of the ovaries may be realized by noting that their extirpation is followed by: (a) amenorrhea (95 per cent.); (b) atrophy of the uterus, and, to a less extent, of the vagina and vulva; (c) the nervous symptoms of the menopause; (d) diminution or abolition of sexual instinct (in the majority); (e) obesity. "If one ovary, or only a portion of an ovary be left behind, these results do not ensue."

The obviously erroneous statement has been frequently reiterated in surgical literature that, where hysterectomy is performed, the ovaries and Fallopian tubes being thereafter considered practically useless, their extirpation should be also recommended, even although they exhibit no macroscopical evi-

dence of gross pathology! The pertinent fact has evidently been overlooked that the ovaries and uterus, having no distinct functional relationship, neither should be sacrificed unless required by pathology which cannot be otherwise eliminated from the economy. Many years ago Claret (1896) and Glaveck (1889) cited conclusive data to substantiate their assertion that the ovaries do not rapidly atrophy and thus become functionless following hysterectomy as was formerly quite generally believed, the most reasonable presumption being that modification of reflex disturbances, where the ovaries were permitted to remain in situ after hysterectomy, was due to their continued functional activity and the consequent effect of the normal ovarian secretion upon the general metabolism.

While as already intimated the meagre clinical data of value contributed to the literature of ovarian conservation is surprising, considerable research and investigation have been prosecuted during recent years, the results of which emphasize the importance of promoting and maintaining the normal ovarian secretion; and the following clinical facts have been fairly well established, according to Marshall, Chipman, Polak, et al. That the parenchyma cells of the ovary secrete a substance which reacts upon the general body metabolism, and controls especially the nutrition, growth and activity of the uterus. "This secretion is present at all times in greater or less quantity, but it is produced in greater abundance at recurrent periods, when it brings about those conditions of growth and hyperemia which characterize the proestrous or menstrual process. After ovulation, which occurs during the estrous, the secretory cells of the ovary show still greater activity, and cells of the ruptured Graafian follicle become converted, largely by a process of simple hypertrophy, into luteal cells of the corpus luteum." Chipman believes that the added secretion of these luteal cells raises the nutrition of the uterus, which leads to those decidual changes in the uterine mucosa which insure the engrafting of a fertilized ovum. When such engrafting occurs, this secretion maintains the nutrition and growth of the placenta until the latter reaches maturity. The decadent and fibrotic changes which the placenta undergoes during the latter months of gestation are coincident with the retrogression and disappearance of the luteal cells. Thus the ovary, while maintaining a perpetual secretion, undergoes a series of cyclical changes which increase or modify this ordinary secretion, and with these the changes in the uterus are correlated. While the exact nature of this secretion is unknown, it is

definite that the loss of the ovary means the loss of sex influence to the individual, and produces grave disturbance in the general metabolism.

The foregoing data anent the normal ovarian secretion are interpolated merely to emphasize the importance of practicing ovariectomy and resection instead of oöphorectomy wherever the pathology for elimination of which surgical intervention is undertaken, will permit the operator to preserve segments of the ovary, which will later be capable of the least degree of functional activity. It has been repeatedly demonstrated that the internal secretion of the ovary is of inestimable importance to the individual, since it not only controls the menstrual cycle, but also exerts a direct influence upon general metabolism.

It may be remarked, in passing, that the tremendous practical clinical value of reasonable conservatism in the practice of pelvic surgery should not induce over-enthusiasm on the part of the operator. The pertinent fact must not be overlooked that there may exist pathological lesions of the ovary and adjacent structures which upon exposure may render conservatism absolutely impossible. Some of the advantages to the individual to be gained by rational conservatism are:

(1) Future pregnancy is rendered possible, provided even part of an ovary and normal tube be left in situ, whether upon the same or the opposite side.

(2) Continuation of menstruation is the rule provided one ovary or functioning portion of an ovary, together with all or part of the uterus, be left in situ. Menstruation has an important bearing upon the mental equilibrium of the individual, especially if she be young and anxious to bear children, and its enforced cessation by double oöphorectomy may induce grave mental disturbances, melancholia, etc., has already stated. For the same reason it is desirable to maintain ovulation and menstruation wherever practicable, even if there be no possibility of future pregnancy.

(3) Provided the whole or even a portion of functioning ovary be left in situ the internal secretion and consequent trophic ovarian influences are maintained.

In considering the vast possibilities of conservatism, however, certain disadvantages and limitations must also be remembered. Of course in a young woman it is decidedly more important to preserve the ovaries, or portions of them as the case may be, than in those over forty, who have arrived at the period in life when the normal menopause may be reasonably expected to occur. It has been demonstrated that after the climacteric the internal secre-

tion of the ovary is so changed or modified as to be of less importance to the individual; but even after this time should extirpation of the uterus be necessary because of a benign neoplasm, it is advisable to leave the ovaries undisturbed, unless they are also hopelessly diseased.

The physical condition of the patient must also be considered. A woman who has suffered intensely for a considerable length of time, and as a result has become practically a chronic invalid whose paramount desire is the recovery of health, is a more unfavorable subject for the practice of conservatism than one not so afflicted. Restrictions are likewise imposed by the existence of certain diseases. For instance where a malignant lesion involves the ovaries, uterus or tubes, conservatism is absolutely contraindicated; also by the presence of purulent or tubercular infection with a resulting interstitial inflammation of the ovary.

Wherever possible the surgeon should investigate and determine the disposition of his patient, i. e., whether she is bright or melancholic, before undertaking operation. Other things being equal, greater conservatism should be practiced in the melancholic than in those having a bright and sunny disposition. While no fixed rules can be formulated, some of the lesions which are favorable to conservatism are:

Small benign tumors should be excised, thus preserving a portion of the ovary. Where an hematoma has not so distended the ovary as to destroy normal tissue, it is only necessary to liberate the clot and close the cavity. Graafian follicle and corpus luteum cysts seldom attain sufficient size and become so intimately connected with the ovary as to require oöphorectomy for their eradication. An ovary prolapsed in the cul de sac, whether it be enlarged, cirrhotic, or small, should not be sacrificed unless implicated in some gross pathological lesion. Atrophied ovaries, and those exhibiting evidence of premature senile change, are usually found in a "bed of adhesions" and practically always return to their normal state after being liberated.

The question of adhesions in this connection is most perplexing and important, since it is in such cases oftener than any other class where, if conservatism be practiced, the patient most frequently returns for secondary operation. The ovary may be found adherent to any of the adjacent pelvic structures, and a grave question always arises whether the suffering of the patient is likely to continue if doubtful structures are left, or whether her suffering will become exaggerated, or will disappear. This feature must be considered whenever pathological or mutilated tissues are permitted to remain in the

pelvis. Not infrequently an ovary not otherwise involved is found embedded in adhesions; if they are non-inflammatory and not extensive, the case may be considered favorable for the practice of conservatism. There are also cases where the adhesions are dense and extensive, yet the ovary may be liberated without injury and preserved. However, where the ovary is buried in dense inflammatory tissue, it is impossible in some instances to free it without extensive injury, thus rendering conservatism impossible.

Esch regards the pus contained in ovarian abscesses as peculiarly virulent, and states that in those of puerperal origin the organisms travel through the broad ligament to the ovary. On the other hand, in many instances where the diplococcus of Neisser is responsible, the infection owes its origin to "surface contamination" and is not the result of organisms within the ovary.

The value of conservative or radical technic will always depend upon the accuracy of the pathological diagnosis, which should apply as well to diagnosis before, as during the operation." Nearly every surgeon has doubtless practiced conservatism with both favorable and unfavorable results. While in some cases which were considered most favorable failure has occurred, this should not be permitted to unduly influence any one against the practice, since success can only be attained by (a) studying the pathology when the abdomen is opened, (b) having a thorough knowledge of the requisite operative technic, (c) understanding the limitations and contraindications to successful conservatism, and (d) in being able to follow the future of the patient. If these principles are adopted many years of comfortable life may be given to the individual. Some of the rules, the observance of which are necessary to insure success, are:

- (1) The exercise of mature surgical judgment.
- (2) The maintenance of an adequate blood supply to the ovary.
- (3) The suspending of the ovary as nearly in its normal position as may be possible.

The surgeon's first concern in the exercise of mature judgment is in the treatment of existing adhesions. He must carefully dissect the adhesions from surrounding structures, leaving the surface of the ovary as clear of inflammatory tissue as possible. If the ovarian tissue be seriously injured either resection or entire removal should be practiced. If inflammatory tissue be left upon the ovary, it will favor the re-formation of adhesions and thus defeat the object of the operation.

Small cysts, few in number, may be punctured and their contents allowed to escape. Resection is

indicated where a single retention cyst is present, but in cystic degeneration where the entire ovary is involved, extirpation and not resection should be performed. In hematoma resection should also be adopted.

In performing resection a knife is preferable to scissors, as the latter (unless very sharp) will unduly squeeze or pinch the ovary. All pathological tissue should be excised, the denuded surfaces being united by a continuous suture of fine catgut, which controls hemorrhage more satisfactorily than a few interrupted sutures. Continued oozing may cause an hematocele, followed by infection and the formation of adhesions unless this plan of closure be adopted.

Properly suspending the ovary, whether resected or not, is a simple but important feature in the operation, the ovary being thus elevated and kept out "of its bed of adhesions." For this purpose a small needle threaded with silk or catgut is passed through the external end of the ovary, then through the upper and posterior surface of the broad ligament.

The question of maintaining a normal blood supply to ovarian tissue left in situ is one of the utmost importance. Failure in accomplishing this has been the cause of many unfavorable results following conservative surgery of the ovaries, edema and cystic degeneration later developing. By studying the ovarian blood supply one may readily appreciate that it may be easily interfered with unless care be exercised in the placing of ligatures where the ovary is not extirpated. In the performance of salpingectomy, when the tube is severed from the meso-salpinx, care must be exercised to incise the meso-salpinx through its extreme upper border. This will leave the blood supply to the ovary normal, and the meso-salpinx will be satisfactory for ovarian suspension. The utero-ovarian anastomosis is especially in danger of being ligated at the external uterine cornu, where the large blood vessels are situated near the tube. In ligating the uterine end of the tube the operator should be careful that the ligature does not extend deeply into the broad ligament, but only includes the upper and inner edge of the meso-salpinx. Blood vessels should be ligated in the upper border of the meso-salpinx as near the cut edge as possible, and in "whipping over" the meso-salpinx one must be careful not to draw the sutures too tightly, otherwise puckering of the tissues (including the blood vessels) will occur and circulation will be markedly interfered with. Excessive manipulation and traumatism of the ovary during the operation should be avoided, and absolute asepsis and hemostasis must be maintained to insure successful results.



Quite recently Polak has called attention to the lack of thorough understanding of the living pathology of the ovary and its supports, and of the failure to appreciate that the position of the conserved or resected ovary is an important factor. He agrees with Chipman that "the natural and proper conservation of the ovary consists in leaving it alone," or of placing it in such a position that there is no obstruction to its afferent and efferent circulation or twisting of its ligament. Interference with the efferent circulation is rapidly followed by change in the ovarian structure, such as swelling from passive congestion, increase in stroma, thickening of the tunica, and cyst formation. From an analysis of 229 cases he presents the following conclusions:

- (1) Only healthy ovaries should be conserved.
- (2) The right ovary when conserved is less prone to subsequent inflammatory changes than the left.
- (3) All retained ovaries or portions of ovaries should be placed in such a position in the pelvis that their circulation is not interfered with.
- (4) Resection gives the best results when its application is limited to large monocysts, retention cysts, fibroids or dermoids.
- (5) The multiple cystic ovary should either be left alone or ablated; resection is not permissible.
- (6) When a resection is made it should be extensive, excising the entire diseased area. The suture should only approximate the wound edges, not constrict them. The retained portion should be "tacked up" in the pelvis to maintain an equal circulation, and the suture line should always be covered with a reflexion of the peritoneum.

Of 112 cases mentioned by Humiston, in which conservative operations were performed upon the ovary, but seventy patients were later heard from; nineteen per cent. of these had given birth to twenty-one children. Only three returned for a second operation. If a similar ratio of pregnancies occurred in those not heard from, it would increase the percentage to about twenty-eight. "In the nineteen per cent. we have a showing that is convincing to a judicial mind that conservative operations are worthy of general adoption."

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SUPRAPUBIC CESAREAN SECTION FOR  
PUERPERAL ECLAMPSIA.

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(Continued from the September issue.)

## CASE REPORTS.

All surgical operations have passed through the period of condemnation, and celiohysterectomy for eclampsia is not an exception to this rule. The lowering of mortality each succeeding year with both mother and child is significant. The great length of time wasted, number of convulsions, degree of manipulation, trauma, unnecessary medication, and general deportment of the attendants, indicated by the reports herein contained, prove that "sufficient unto the day is the evil thereof." Who would dare indulge in such practice with other emergencies and yet the sentiment of the International Medical Congress, Geneva, 1896, concluded that "Cesarean section, as well as forceps delivery, is not justified until all other methods have failed."

This sentiment prevails at the present time in private and public hospitals in the face of such evidence as is shown by the reports from the records herein contained.

The following tables and cases are submitted, believing that they will add materially to the sum total in solving this perplexing problem. Among these reports are many delayed cases with a high mortality, but those cases operated on early show a very low mortality, indicating conclusively the danger of delay to both mother and child.

Sloane Hospital for Women, New York, reports that there is no obstetrical service at Roosevelt Hospital, and that Cesarean section for puerperal eclampsia has never been done at the Sloane Hospital for Women. "*The policy and teaching of this institution is against delivering such cases by abdominal operation.*"

There are a score of reports of successful self-inflicted suprapubic Cesarean section, also reports of this operation having been done upon various kinds of animals with probably as favorable results as in man, but Cesarean section for eclampsia is of very recent origin, one of the first to suggest it being Lauerjat, 1810. It was, however, not performed until Akker, 1875, records the first suprapubic Cesarean section for that purpose. This was successful, though he had the complication of a deformed pelvis.

Halbertsma, 1890, made three suprapubic sections for eclampsia, saving two mothers and three children; and Oldhausen, 1899, reports three such operations, saving two mothers and three children.

Kittlitz, 1897, reported 23 high operations with 11 deaths; and Hillsmace, 1899, records 40 such operations with 20 deaths, thus showing a mortality of 50 per cent. before 1900. Streickeisen, 1903, reports 26 operations with only 5 deaths.

Any discussion of Cesarean section *per se* would be incomplete without reference to the voluminous statistics of Dr. R. P. Harris (1885-90), Philadelphia. But as the following cases refer only to the suprapubic route for eclampsia alone, his work will not receive further consideration. The same may be said concerning the work of Dr. Ruben Peterson, who gives the following four tables to show the maternal mortality in prompt delivery, and the expectant treatment of eclampsia.

Prompt Delivery		Expectant Treatment	
No. of Cases.	Mortality %	No. of Cases.	Mortality %
615	98=15.9	390	113=28.7

Showing Results of Immediate Delivery and Conservative Treatment of Eclampsia.

Immediate Delivery		Conservative Treatment	
No. of Cases.	Mortality %	No. of Cases.	Mortality %
150	6=4.0	147	46=31.2

Maternal Mortality After Spontaneous and Operative Delivery in Eclampsia Before 1900.

Spontaneous			Operative		
No. of Cases.	No. of Deaths.	Mortality %	No. of Cases.	No. of Deaths.	Mortality %
1,126	263	23.35	1,443	406	28.13

Maternal Mortality After Spontaneous and Operative Delivery in Eclampsia Between 1900 and 1912.

Spontaneous			Operative		
No. of Cases.	No. of Deaths.	Mortality %	No. of Cases.	No. of Deaths.	Mortality %
290	57	18.96	1,490	222	14.83

The fetal mortality by operative measures from 1900-12 has been reduced from 41.17 to 28.6 per cent.

In 315 by vaginal section the mortality was only 21.2 per cent. when vaginal section was made; when only three convulsions occurred the mortality was only 11.8 per cent.

Ruben Peterson (*Surg., Gynecol., and Obst.*, p. 203, August, 1913) states that in 425 cases of eclampsia treated by abdominal Cesarean section, the maternal mortality before the aseptic era was 36.9 per cent. and that in 317 of this number, since 1900, the mortality has been reduced to 31.8 per cent. In 245 cases without infection the mortality was but 24 per cent. In 317 cases, since 1900, the fetal mortality has been 5.5 per cent., and the mother but 3.7 per cent. in 132 cases where the sections were performed after one to five eclamptic convulsions.

That the severity of successful and unsuccessful cases operated on has been greater than those treated medicinally there can be no question.

Peterson's final conclusion is, that the "operative procedure which will empty the uterus the quickest with minimum trauma and shock to the eclamptic mother and child should be selected."

Fetal mortality has generally been 44 to 54 per cent., but this high percentage has been reduced to

about 25 per cent. Many children are saved though the mother be dying or dead, but few mothers are saved if the child be dead. This would of itself indicate that the majority of each may be saved with early operation—after the first convulsion or the beginning of the comatose state.

Eclampsia ceases more frequently after artificial than natural labor.

Dr. T. Halbertsma (*Nedrl. Weekbl. and Obst. Gaz.*, xiii, 1890, Cinti.) has performed Cesarean section in three cases of eclampsia. In the first case, operated on 1878, the child was saved, but the mother died of peritonitis. In the second case, in 1888, both mother and child lived, the mother being discharged in six weeks after the operation as perfectly well. In the third case the operation was performed after hypodermatic injections of morphine and inhalations of chloroform had been tried without effect; mother and child were saved. The author recommends this mode of treatment on account of the very unfavorable prognosis of eclampsia.

Goltano (*Gazz. med. di Torino*, xlii., pp. 205-225, 1892) and Brothers (*Amer. Jour. Obst.*, New York, xxiv, 1896) each report upon this method of suprapubic section for eclampsia. Kittlitz, 1897, reported 23 cases of abdominal Cesarean section maternal mortality of 50 per cent. Hillman, 1899, records a case stating that the maternal mortality varies in 40 cases from 40 to 52.5 per cent.

Olshausen, 1900, performed abdominal Cesarean section three times out of his last 250 cases of eclampsia, saving two mothers and three children. Streickeisen, 1903, adds 26 cases to those of Hillman with a maternal mortality of 26 to 32 per cent. Sir J. H. Croom (*Trans. Edinburgh Obst. Soc.*, vol. xxxix, p. 194, 1903-04) records two cases, the first operated on in Scotland; one a primipara, 20 years of age, near full term (a Porro), os undilated. Death followed six hours after operation; contracted pelvis. Second case, primipara, aged 46, contracted pelvis, elongated cervix, died at end of two days; child lived. Dr. F. J. McCann, 1908 (*London Lancet*, September 10, 1910), reports a case of 26 years; primipara; os rigid and elongated; child born dead; mother lived; fits ceased after operation.

Dr. J. B. Murphy states that he has never seen a fatal case of Cesarean section, while Dr. E. C. Dudley says: "I regret to say that I have no experience in the subject of abdominal Cesarean section for eclampsia."

Judd (*Surg., Gyn. & Obst.*, p. 552, June 19, 1913) states that various observers believe Cesarean op-

eration to be the safest in cases of placenta previa, and in some cases of eclampsia, and that uncontrollable hemorrhage is an indication for removing the uterus; although Cesarean section has not been done for eclampsia in Mayo Clinic.

Boston Lying-in Hospital, July 3, 1913, replies: "We have had two cases of Cesarean section (abdominal) done for eclampsia without mortality. There have been five vaginal Cesarean sections for eclampsia. Of these, one mother died; three babies died, and one was still-born (five months miscarriage). Our visiting physician has performed two abdominal Cesarean sections for eclampsia in his private practice without mortality."

Massachusetts Homeopathic Hospital answers as follows: "During the year 1912 there were four Cesarean sections performed at this hospital for puerperal eclampsia, of which two died and two recovered. In 1911 there was one, who recovered. This year there has been thus far two such cases, both recovered."

E. P. Davis' reply of June 27, 1913, is as follows:

I have not kept separate statistics for puerperal eclampsia and Cesarean section, because I group eclampsia cases with infected and toxemic patients, and from the standpoint of Cesarean section as an operation, eclampsia is not especially interesting. My statistics of Cesarean section up to date are as follows:

Patients in fair condition, that is, not highly toxemic nor having streptococcic infection at the time of operation, 105. Maternal deaths, 1, from infection with *bacillus proteus vulgaris*. The source of the infection could not be ascertained by autopsy. Maternal mortality, 96 per cent. Fetal mortality in full term children in fair condition, *nil*.

Cases highly toxemic, including eclampsia, having pneumonia, heart disease, or septic infection, 30. Maternal deaths, 10. Patients recovering were those delivered by the Porro operation, and were septic at the time of operation. Fetal mortality in this series cannot be estimated, as all were in a highly diseased condition.

Post-mortem and moribund sections, 2. Total, 137.

The kinds of operation employed were as follows:

Celiohysterotomy, 81; celiohysterectomy, 34; Porro, with extraperitoneal treatment of the stump, 20; post-mortem and moribund sections, 2. Total maternal mortality of the entire series, 7.9 per cent. Mortality of cases in good condition, .96 per cent.

Among these were 13 cases of placenta previa, treated by celiohysterotomy, with no maternal death.

As regards the treatment of eclampsia, I consider it a fulminant toxemia. We first bleed the patient, and give intravenous saline transfusion, the stomach is thoroughly irrigated, and five grains of cal-

omel with soda placed in the stomach. The bowels are thoroughly irrigated. Unless the patient is excessively relaxed, she is put in a hot pack. If the os is dilated the membranes are ruptured. If labor develops, and can safely and speedily be terminated by forceps or version, this is done. If the patient does not improve, and if labor does not develop and the patient is at or near term, she is delivered by celiohysterotomy.

In our experience Cesarean section is indicated in eclampsia in not more than 20 per cent. of cases. It should, however, be promptly performed if improvement does not otherwise follow.

Dr. E. E. Montgomery states: "My experience is confined to one case that was no more than threatened eclampsia. Patient was seen on the 23d of February, 1912, and had almost complete suppression for twenty-four hours, then pregnant eight months. Under benzoate of calcium in plenty of water, the amount of urine was considerable increased; but the arterial tension, which measured 175 under nitroglycerin in .01 grain doses was reduced only to 169. She complained of severe headache; pulse slow and tension very high. It was her first pregnancy, the superior strait was contracted and the vagina small. Under such circumstances I decided the chances for the child were best by the Cesarean section. This was done on the 26th of February, and the patient never had an unpleasant symptom following. The child survived, and although it weighed but four pounds, it is now a strong, healthy child, and the woman has enjoyed excellent health ever since."

Dr. S. S. Halderman, Portsmouth, Ohio, reports as follows: "Mrs. K., white, primipara, comatose when first seen in June, 1909, but not convulsive. Celiohysterotomy. Recovery, uneventful. Mother and child living July 7, 1913."

Dr. A. H. Barkley, Lexington, Kentucky, July 20, 1913, reports the following cases:

CASE I:—Mrs. J., aged 30, white, 1 child living. In labor five hours, and had two convulsions before first visit. At the end of the second convulsion the os was rigid, and the urine contained casts and albumen. No convulsions after operation. Fallopian tubes removed. Mother and child recovered.

CASE II:—Mrs. R., aged 28, white. First child. Three convulsions before operation. Urine contained much albumen and many casts. Mother and child recovered.

CASE III:—Anna M., negress. First child. Had six convulsions before operation, at which time the os was one inch in diameter, with contracted pelvis. Urine contained much albumen and many casts. Fallopian tubes removed. Mother and child recovered.

CASE IV:—Negress. Three convulsions before operation. Pelvis normal. Urine showed albumen and casts. No convulsions after operation. Mother

and child recovered; the latter weighed 10½ pounds.

CASE V:—Mrs. C. Third labor. Four convulsions before operation. Ovarian cysts in lower pelvis. Os 1½ inches in diameter. Bladder empty. Mother and child recovered. Chloroform anesthesia for the five cases.

Dr. Fitch, of Portsmouth, Ohio, July 8, states as follows: "Mrs. H., aged 23, family history good. Eighth month of gestation. Saw patient first on April 22, when she was recovering from convulsion, was cyanotic, cardiac action weak, unconscious. I made an examination, and found soft parts swollen, and a narrow, contracted pelvis. Had council, and decided to remove her to hospital, and perform Cesarean section, without attempting to deliver by the vaginal route, as the patient was not in labor, and there was no dilatation of the os. Child was removed from abdomen in seven minutes, was weak and weighed only three pounds, and died on the third day. Mother made a good recovery, and was discharged from hospital the 18th day, but had albuminuria for five weeks."

Dr. F. W. Williams, Portsmouth, Ohio, July 9, 1913, made a celiohysterotomy in 1905, for puerperal eclampsia, without convulsions. Patient, aged 30, first child, comatose for thirty hours. Great adiposity. Child dead for several hours. Patient lived for twelve hours.

Dr. Stuart McGuire, Richmond, Va., July 15, 1913, states: "Have personally done two suprapubic Cesarean sections for puerperal eclampsia. Both women had gone to full term. Both mothers and one child lived. The os was dilated in one case, but labor had not begun in the other. Both cases were operated on within twenty-four hours after the first convulsion. One woman had never been pregnant before; the other had one child."

Dr. Thos. J. Watkins, Chicago, July 12, 1913, states that he has done one such operation for eclampsia at full term, with undilated os, four hours after first convulsion. First pregnancy; saved both mother and child.

Dr. F. F. Lawrence, Columbus, Ohio, July 19, 1913, states: "I have performed but one Cesarean section for puerperal eclampsia. That at the seventh month. The os was not dilated. The operation was performed 5½ hours after the first convulsion. It was the third pregnancy. Mother recovered. Child was not saved. There was but one slight convulsion after the operation. Because of the fact that there was a fibroid in the left anterior wall of the uterus, I performed a Porro operation. This was almost seven years ago, and the woman remains in excellent health."

Dr. Shelton Horsely, Richmond, Va., July 20, 1913 reports: "Two Cesarean sections for eclampsia. In both a typical abdominal operation was done. The period of gestation was between seven and eight months. In one case there were twins. In both instances the mother had been having convulsions for ten days, and was almost in a moribund condition and unconscious when they were delivered. Both mothers and all the children died. One mother lived two days, and the other fifteen hours. All the children were born alive, but died within three days."

Dr. W. D. Haggard, 1907: "Cesarean section, multipara, 19 years old. Pregnant eight months. No pains. Convulsions for several hours. Child and mother living four months after."

The Johns Hopkins Hospital states that they have treated 112 cases of eclampsia. Cesarean section was done in only two cases, and there were no fatalities.

City Hospital of St. Louis states: "In the year beginning April 1, 1909, and ending March 31, 1910, there were two cases, both received after delivery, and both died after Cesarean section, one child living and the other premature. In 1910-11 there were three cases, one of which lived twenty minutes after entrance; the other two also died, induced labor being performed; one child had been dead some days, the other child lived. In 1911-12 there was one case, not operated on, and lived. In 1912-13 we had two cases, not operated on, both living. Since April 1, 1913, we have had no cases of eclampsia."

Dr. John C. Altman, Nashville, Tenn., says: "I have had two cases of puerperal eclampsia, for which we did a suprapubic Cesarean section. Both patients were primiparae; one white, and one colored. The colored one was sent into the hospital, having had a number of convulsions, and was markedly comatose. Upon examination I found a large fibroid in lower posterior wall of uterus. She recovered, child being dead before she reached hospital. The other case was 18 years old, primipara, 8½ months, 12 convulsions, cervical canal intact, no labor pains. Mother and child both lived. She has had two subsequent labors without complications. Time from first convulsion to operation, 10 hours.

B. M. Ricketts has done five suprapubic Cesarean sections, with but one for eclampsia, and Edwin Ricketts had five to record without any for eclampsia.

CASE I:—Patient white, 33 years old, 150 pounds, married, well developed, primipara, excellent health during pregnancy.

Examination of urine, negative until six weeks before delivery. No examination after that period. Supposed to be two or three weeks overdue. Slight headache on June 5. Sudden and severe convulsions, 4 A. M., June 6, when Dr. Gillett was called.

Entered hospital 7 A. M., June 6. Six convulsions from 4 to 7 A. M., and three from 7 to 8 A. M., making nine convulsions before operation. Cervix undilated. Never any labor pains. Celiohysterotomy at 8 A. M. Chloroform narcosis. Child normal position. Child and placenta delivered within 90 seconds from time knife was applied. Total time consumed in operation, 33 minutes.

Severe convulsions at 8:50, 9:20, 10, 11 A. M., 12 M., and 12:45 P. M. Total, 15 convulsions. None occurred after 12:45 P. M. From 9 A. M. until 3 P. M. one-half ounce of veratrum viride was given subcutaneously in 40 and 50 drop doses; with 130 grains of chloral hydrate and 240 grains of strontium bromide by the mouth. Twelve pints of water containing  $\frac{3}{2}$  of bicarbonate soda and  $\frac{3}{4}$  of chloride of sodium were given subcutaneously under the mamma. High delirium from 4 A. M., June 6, to 9 A. M., June 7. At 3 A. M., June 7, the bed became saturated with urine passed involuntarily. Artificial heat and blankets from 8 A. M. to 11 P. M., during which time there was profuse perspiration, bowels moved freely on June 8. Recovery uneventful with primary union. Discharged mother and child June 24. Both well and happy, though she did not supply a sufficient amount of milk for the child. There is no question of full term gestation.

In the case of Fitch, the baby lived three days, though it weighed but as many pounds. That of Williams was hopeless from the late hour he first saw her, as were the two cases of Horsely, who was not called until the expiration of ten days. This feature of delay existed alike in the two cases admitted in the St. Louis Hospital and the two cases in the New Orleans Charity Hospital. The same can be said of the three deaths of children and one mother in Johnson and Willis' ten cases.

Dr. Henry Schwarz, St. Louis: "Yours of the 8th inst. received in due time; if I understand you right, you are collecting data on cases in which women have been delivered by abdominal Cesarean section, and in which eclampsia furnished the indication for operation.

"I have delivered two women during eclamptic convulsions by laparotomy; the first at Washington University Hospital, October 25, 1911. Mrs. C., 20 years old, colored, at the end of her first pregnancy was brought to the hospital in convulsions; the uterus was small and empty; it was a full term ectopic, the sac being formed by the right tube; the child, a boy, lived 24 hours, the mother had had ten convulsions before, and an equal number after de-

livery, she remained unconscious for two days, but made an uneventful recovery."

"The second case took place at St. Ann's Maternity Hospital, December 9, 1912. Mrs. C., aged 17, at full term, was brought to the hospital because she had convulsions; examination revealed a closed cervix, an empty contracted pelvis, with a conjugate of 8 cm. and twin pregnancy. In this case I did a classical Cesarean section; the children, two boys, are living. The mother had three convulsions after delivery and remained unconscious for 24 hours; she made an uneventful recovery. So you see that in none of my cases did eclampsia furnish the indication for operation. I do not believe eclampsia as such ever forms a justifiable indication for Cesarean section."

Dr. John L. Forwood, Chester, Pa. (personal), September 17, 1903, states that he has done two Cesarean sections for puerperal eclampsia, each full term, as in each case dilated. One primipara with ten convulsions before operation and one multipara with twenty convulsions before operation. Mothers and children all saved.

Nacke (*Deutsche Gesellsch. f. Gynak.*, Halle, May, 1913) emphasizes the importance of operative delivery, namely, the uterus is liberated from the dangerous muscular tension and the reflex irritation it induces. The pressure is removed from the abdominal vessels, especially those of the kidneys. The diaphragm is allowed to recede, and the lungs and heart are not impaired. The delivery therefore accomplished the removal of a great number of complicating conditions, which alone may cause death, even without eclampsia.

Dr. C. S. Hutchinson, Los Angeles, California (personal), September 27, 1913, states that he has done one suprapubic Cesarean section for puerperal eclampsia, saving both mother and child. Patient, 22 years old, primipara, supposed eight and half months gestation. On the evening before operation feet and hands badly swollen, considerable amount of albumin in urine. During the afternoon of the following day she became convulsed, sent to the hospital, as undilated, and no labor pains. She had five convulsions within four hours, at the end of which she was operated on.

#### PRE-OPERATIVE AND POST-OPERATIVE TREATMENT

Hot packs are more prompt and effectual than other heat-producing methods, though there be some danger in the wet garments remaining about the body unnecessarily. They are not so convenient as other methods, such as the hot-water bottles and earthen substances. The electric heater is infinitely better than all other methods, because it answers

every purpose without dampness or the dangers of burn.

Nitroglycerin, 1/50 to 1/30 grain, given until its therapeutic effects are noticeable, has been recommended, but there is great doubt as to the advisability of resorting to its use.

Croton oil, given in two drop doses on sugar or flour, soon after the operation, is advisable in those cases attended with difficult evacuation of the bowels. These doses may be repeated if necessary every two hours until eight or ten drops are administered.

Calomel should be given in small doses combined with bicarbonate of soda immediately after the operation.

Ezerine would probably be an ideal remedy if injected into the ileum when the abdomen is open; otherwise it is not to be recommended.

Veratrum viride is the time-honored remedy, and when given in 25-drop doses every twenty minutes until the pulse is diminished in beats to fifty, is supposed to be by a few advocates a panacea. None but the best of preparations should be relied upon. It would seem that the therapeutic effects of the drug have been overestimated, otherwise it would be more generally accepted and lauded. Then, too, toxic doses are ever looked for. It has an accumulative effect that results disastrously. The popular belief that failure to produce physiologic results is due to an imperfect quality of the drug, does not answer the argument against its use. Something more is apparently necessary to prove that veratrum viride will prevent or overcome convulsion in the eclamptic state. It may lower tension, but will not increase excretion of poisons. Will lowering pulse tension, prevent convulsions?

#### *Salt and soda solution.*

1. Mouth.
2. Intravenous.
3. Subcutaneous.
4. Proctoclysis.

By mouth. If possible water should be given through the mouth and stomach by swallowing, or artificially through a tube, in large quantities.

Intravenous is the most direct, assuring more immediate effects, and when in proper hands is the method of choice. Any vein or artery may be appropriated, though those of the arm are given first, and those of the leg second choice.

Subcutaneous method is more commonly practiced, being more generally understood and easily cared for, especially during the convulsive state. Great care should be exercised to avoid disarrangement or breaking of the tube or needle, an accident

not uncommon during a convulsion. The point of insertion of the needle, which should carry a lumen 1/16 inch in diameter, should be near the mammary glands as low as the umbilicus and extending to a line parallel with the nipples and laterally upon either side to the mid-perpendicular line, the amount varying from six to fourteen pounds, depending upon the body-weight, proportionate with the weight of the body.

Proctoclysis can best be resorted to when the patient is quiet or forcibly kept so, and should be continued until ten or fifteen pounds of normal salt solution have been absorbed at the rate of two drops per second, and of the body temperature.

Phlebotomy has been practiced throughout many centuries, supposedly with brilliant results. Indeed, with the obese and plethoric its benefits cannot be questioned, though other measures may be more appropriate. One to three quarts of blood have been extracted without serious result, depending upon the body-weight.

Bromides, soda potassium strontium, etc., are no doubt of more or less benefit in eclampsia, varying in degree, but not at all curative or of benefit in convulsions severe in type. They are probably only adjuncts in their treatment. They may be given by the mouth or rectum in large doses.

Sodium benzoate, like the bromides, has been suggested, but the results have been equally unsatisfactory.

Chloral hydrate has for many years been a popular remedy, but doses large enough to be at all beneficial are more or less dangerous. Its use has deteriorated, giving place to more certain remedies. When administered, it should be given, well diluted, in large or small doses, by mouth or rectum until physiologic effects are obtained.

H. M. C. is probably seldom indicated, but when convulsions continue, or there is a high degree of restlessness after operation, one or two doses given within two hours will prove beneficial, but like opium preparation is dangerous.

Pulmonary anesthesia by ether, chloroform, gas, or any of their combinations is dangerous to both mother and child, and should be condemned when other remedies can be obtained.

Spinal anesthesia is only mentioned to condemn it upon general principles, such as relate to cord injuries and a high mortality.

Pituitrin: Gorsew (*Surg., Gyn. & Obst.*, p. 564, June, 1913) gives his experience in 48 labor cases, of which 25 are reported somewhat in detail, the author makes the following observations:

Pains begin in from two to ten minutes, accompanied by abundant micturition. Pituitary extract



stimulates pains better during the second half of pregnancy, especially at its end; it gives good and reliable results in the first stage, and acts still better in the stage of expulsion. Anesthesia, and especially morphine, inhibits the action of the extract. It is more reliable than hot douches and metureury-sis for effecting artificial premature labor. It frequently is able to supplant forceps, and Kristellz's expression. Pulmonary tuberculosis, diseases of the heart and kidneys, eclampsia, marginal placenta previa, and premature detachment of the placenta he does not consider contra-indications. He relates that edema completely vanishes in from 8 to 19 hours, while the albumen markedly decreases or disappears from the urine after its use. It hastens the expulsion of the placenta. He observed no injurious effects on mothers or children.

In cases of atonic post-partum hemorrhage the extract gave reliable and permanent results, stimulating strong contractions of the uterus. He asserts that irregular pelves not below the medium degree of contraction are not contra-indications to the administration of pituitary extract.

#### DRY CLEANING IN ACCIDENT SURGERY.\*

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Although Lister, back in the '60's, grasped the fundamental principles of wound infection and the use of antiseptics, there has been since that time a multiplicity of methods and agents used to accomplish the results. Some of the so-called improvements in the use of antiseptics have been detrimental to good work, but there has been a gradual evolution that has resulted in simpler and better methods.

Lister, in his original work, as you all know, thought that even ordinary air should not come in contact with wounds and all his operations were done under the carbolic spray with all the rest of his complicated technic.

Many surgeons went to the other extreme, among them the late Lawson Tait, who discarded all chemical antiseptics, claiming that "asepsis" was only a matter of cleanliness, and depended upon scrubbing the skin with soap and water, while the majority of surgeons used the combination of scrubbing with soap and water and the use of chemical germicides, most of them using bichloride as the chemical agent. Except in accident surgery this method did not harm, but in case there was an open wound their elaborate preparation by scrubbing, etc., carried more or less filth into the wound, thereby infecting it.

As Eisendrath says in Keen's Surgery, comparatively few compound fractures are infected when first seen, but become infected by the surgeon's elaborate preparation.

The advocates of chemical sterilization of the skin with bichloride of mercury backed up their opinions with the results of the laboratory experiments, but even these were not free from fallacies. Those who pinned their faith to sublimate did so largely on the laboratory researches of Robert Koch, who in 1881 was the first to compare the germicidal values of the various antiseptics on pure cultures of bacteria. Koch's sources of error were, first: His infectious material was in a dry state, also a certain amount of the disinfectant was carried on a thread and continued to act upon the germs after being removed from the solution, which source of error misled the profession in thinking that bichloride of mercury had a high germicidal power.

Many of the early laboratory workers did not take the element of time into consideration, in compiling their results. Post and Nicoll, in *Journal of A. M. A.*, Nov. 5, 1910, give the results of their laboratory experiments concerning the comparative efficiency of some of the common germicides, in which article they lay great stress on the time element which we all know is a very important factor in deciding the efficiency of antiseptics in accident surgery. They show that it took twenty hours to destroy all the streptococci and gonococci with a 1,200 solution of bichloride, and it took more than 30 minutes to destroy all the gonococci with a 1-500 solution of bichloride. A 1% solution of formaldehyde took twenty hours to destroy all the gonococci and streptococci, and a 2% solution of formaldehyde and glycerin took twenty hours to destroy all the streptococci and gonococci, and there were 200 colonies of pneumococci in one loop of the test solution after the twenty hours' exposure.

I might go on indefinitely quoting from the tables, but in contrast to those, a 50% solution of alcohol destroyed all streptococci and gonococci in one minute.

The tables on iodine were not exhaustive as for some of the antiseptics, but the water solution 1-400 of tincture of iodine destroyed streptococci, gonococci and typhoid bacilli in every case in less than one minute.

From the experiments of Post and Nicoll we are led to believe that the good results obtained by surgeons in that period when bichloride of mercury was the chemical agent used, were due not to the bichloride but to scrubbing with soap and water

\* Read before the New York and New England Association of Railway Surgeons, October, 1913.

and the power of the blood to destroy the bacteria that were not washed away.

The sterilization of the skin by iodine was the first method used where surgeons depended entirely upon chemical sterilization. Thus there could be no doubt from a clinical standpoint what agent destroyed or got rid of the germs; and this clinical experience is backed up by the most painstaking laboratory experiments.

Iodine also has other properties that are valuable in surgery. The late Nicholas Senn, years ago, showed that iodine was not only a powerful antiseptic but a potent agent to stimulate local phagocytosis. For that purpose it has one advantage when dissolved in glycerine, over balsam Peru or iodoform, in that it keeps the wound so much cleaner. Iodine also is a potent agent to stop hemorrhage, as pointed out by Emmett in 1880. It acts not by coagulating the albuminoids as does hot solution of bichloride and some other agents, but by contracting the coats of the arterioles. The profession in nearly all countries of the world have seemed to realize the advantage that sterilization by iodine has over other methods, and I have found surgeons using iodine in many out of the way places. In the spring of 1911, I saw them using the iodine method of sterilizing the skin in Barbadoes and other West Indies as well as in Panama; and in my recent trip around the world the iodine method was used in nearly all the hospitals that I visited, not only in Europe but in the Orient.

In 1910 I read a paper before the Association of Rutland Railway Surgeons, in which I summarized the report of a large number of accident cases treated with iodine, in my service as Division Surgeon of the Rutland Railroad; and the only case in which I got any pus was a punctured wound, done with a blunt instrument. The hole was so large I did not incise it and I got pus, but the case made a rapid recovery.

There have been several different methods of using iodine as an antiseptic, but to technic which I have used the last two years I have called "dry cleaning." It originated in Bastianelli's Clinic in Rome, Italy. It has been used in the Mayo Clinic for the past three years. My attention was first called to it by an article on the subject, by one of the Mayo staff. Dry cleaning, or sterilization with iodine, consists of washing the skin with a solution of iodine in gasoline 1-1000; always taking care to wash from the wound. As soon as the skin is dry go over the skin with one-half strength tincture of iodine. If there is much oozing from the muscles after the vessels are tied, apply the tincture of iodine

or pack the wound temporarily with gauze wet 3½% tincture of iodine.

It is very important not to use any water to macerate the epidermis, as the sterilization with iodine will not be efficient.

As tincture of iodine is such a bad agent to have in one's bag, since it corrodes everything, I conceived the idea of having the pure iodine put up in gelatin capsules and sealed. 4.89 grains of iodine in each capsule, mixed with one pint of gasoline, 1-1000 solution, and a capsule of 13.59 grains of iodine in one ounce of alcohol makes 3½% or one-half the strength of the official tincture of iodine.

It has worked out very nicely and I make the solution extemporaneously as required. It is not necessary to combine iodide of potassium with the iodine, and the combination will dissolve the capsules while iodine alone remains dry. Later I tried to get the iodine put up in glass ampules, but have not yet succeeded; but I have learned the surgical department of the United States Army has had several hundred thousand of tubes of iodine with potassium iodide put up for the above purpose, although there has not been any put up for commercial use.

In a few cases where the wounds are very dirty I have irrigated them with a solution of iodine, 2 drams of the tincture to a pint of water, but I never do that until after I have sterilized the skin with the tincture of iodine. If drainage is required I use a split rubber tube with gauze wick moistened with solution of iodine in water or glycerin. When the oozing of blood can be arrested and the wound sewed up, a gelatin preparation devised by my friend, Dr. Townsend, is a very convenient dressing. The gelatin is in thin sheets made antiseptic by incorporating with iodine, and the outer surface has been made water-proof.

My excuse for presenting these rather cursory remarks is the almost uniform results of preventing infection by the assembling of the foregoing simple procedures in contrast to a number of cases where pus developed in accident cases where sterilization had been attempted by very able men by a tedious and complicated technic.

Do not amputate an extremity for sarcoma without a previous careful examination of the lungs and mediastinum for metastasis. Such symptoms as continued cough, a small hemoptysis, or beginning dyspnea, should be regarded as highly suggestive of such a complication.

## STRAIGHT DIRECT LARYNGOSCOPY, BRONCHOSCOPY AND ESOPHAGOSCOPY.

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(Continued from September Number.)

### CHAPTER VIII.

Before taking up the subject of esophagoscopy, the writer wishes to insert a chapter from Brunings' book, which is remarkable for its clearness and practical value. Under the title "*Bronchoscopic Operations and Methods of Treatment*," Brunings says: "Among all bronchoscopic operations, the removal of foreign bodies which have been inhaled easily takes the first place, not only on account of the frequency of their occurrence, but also on account of the importance of their removal as a life saving device. The question of removal must at this point receive detailed attention first of all, but at the same time the diagnosis and pathology of foreign bodies must not be neglected. I should like in accordance with the object of this book, to simplify the main therapeutic difficulties, in particular the technic of the extraction, although I am quite aware that the description of an operative technic which affords such an unlimited scope to personal skill, ingenuity and talent for mechanical adaptability, encounters quite special difficulties.

1. *Diagnosis and therapeutics of foreign bodies in the bronchi.* 1. General purport of the method. Thirteen years have passed since Killian first removed a foreign body by means of direct upper bronchoscopy. Accounts of about 600 successful bronchoscopic extractions of foreign bodies have been published during this time, and very many more must remain unpublished. Kahler, to whose report at the Third International Laryngo-Rhinological Congress (Berlin) I frequently refer in the following account, rightly says that the publication of simple uncomplicated cases of foreign bodies has already gradually lost all interest. I myself have only published from my series those cases which for any special reason could be considered instructive. And so it may be supposed, without much likelihood of error, that the true number of successful bronchoscopical extractions can no longer be exactly computed, and in any case reaches far more than 600. At the first glance this great num-

ber seems imposing, and yet what is really imposing is not the total but the rapidity of the increase in proportion to the time. While before the year 1896 only five cases were reported, the total number at the end of the year 1900 had already reached 19; in 1904, 36; in 1906, 137; in 1907, 165; in 1909, 304; and in 1911, 595. This enormous progress appears especially striking when graphically represented. The reasons for the enormous increase in the number of foreign bodies diagnosed and extracted by bronchoscopy are mainly two. Firstly, each surgeon who practises bronchoscopy propagates the method, and by successful operations attracts attention and gains confidence for it among the medical profession and public. In this way an increase takes place in personal local statistics, for which I can give as an example the figures of Killian. Still more striking are the figures from the Breslau clinic, which I have graphically represented. The second and far more practical way is that a number of bronchoscopically efficient practitioners is arising in the country, each of whom in his turn is interested in every possible way in the local introduction of the method. The rate at which this form of progress is taking place has been discussed by Killian in his paper before the Third International Laryngological Congress at Berlin in 1911; and I myself, at Jena, in the last year and a half, have already (endoscopically) instructed over 100 surgeons in weekly demonstrations. How far these numbers are short of the truth is shown by the fact that my own instrumentarium has been used in over 1,000 cases. It seems to me that statistics on foreign bodies would show quite different numbers if the local propaganda of Killian's method had been carried on everywhere with sufficient vigor. The fact that already in the first year of my practice in the Jena clinic, nine foreign bodies, five of which were in the windpipe, were removed by endoscopic means, all of which arose in the locality and its surroundings, may illustrate what may be attained by these means. This extraordinarily high number, compared with the former figures, appears likely to be surpassed in this second year. The method has been introduced, and is now recognized, in Jena and its neighborhood. These are certainly the first cases of endoscopically extracted foreign bodies which our small university has to show. Most of my colleagues here knew the foreign body in the bronchus from hearsay only, and their surprised inquiries concerning the cause of this sudden increase in foreign bodies may be understood. The answer is simple. Professor Wittmaack and I have propa-

gated and recommended the knowledge in Jena, as well as in other neighboring towns of Thuringia, by demonstrations and extensive lectures for general practitioners; have directed observations to the appearances, the frequency and the dangers of foreign bodies which have been inhaled; and have not omitted the consideration of the evidence of successful operations in local medical journals. Without doubt, enough has not been done in this direction. How can it, then, be understood that so little is heard of the extraction of foreign bodies in many great cities—above all in Berlin, with its millions of inhabitants? Bronchoscopic literature receives attention almost exclusively in technical journals, whereas it is of extreme importance that the general practitioner should be acquainted with this branch of the study. Bronchial foreign bodies give rise, apart from the rare cases of suffocation, to many symptoms of lung disease. The patient goes to a physician, and, unfortunately, has the experience that the affection is misinterpreted, and that, too, after searching inquiries into the history of the case. This latter is not always a matter of reproach, considering how uncertain and complicated the history can be and, in most cases where children are concerned, often is. Moreover, it must be considered that, in many cases, foreign bodies never give rise to any symptoms, still less to the characteristic ones, and so are not traceable with certainty by any of the usual methods of clinical research. Because, in the most favorable cases, the diagnosis will rest only on the supposition of a foreign body, independent of the greater or lesser probability, the doctors should always justify it by bronchoscopy, even if this only occurs in one case out of ten. If the curve of frequency of foreign bodies is looked at once more, and the extraordinarily great increase considered, the reflection will occur that the previous extractions are associated with a relatively small number of names, which in Germany, for example, are to a certain extent concerned with but a small series of foreign bodies. It also becomes clearly evident that the status of bronchoscopy at the present time gives, as yet, an absolutely incomplete picture of the part which it will play in the hands of the specialist in the future. Surely even Killian never anticipated this development of the subject on the occasion of his first successful extraction thirteen years ago. Requirements often only come to light after the possibility of satisfactory results is established. After these general remarks, it is worth while to look again at the special services of tracheo-bronchoscopy for the recognition and treatment of foreign

bodies. The diagnosis of the foreign body has become possible, in almost every instance, only since the employment of the direct method. Only in 7 per cent. of all published cases could the foreign body not be detected by bronchoscopy, and of these the cause of the failure in many cases was due to insufficient practice or unnecessary instruments, seeing that in the statistics of the last two years, of 291 cases, only two—*i. e.*, 0.7 per cent. of the cases of foreign bodies—could not be seen.

With reference to the service rendered by tracheo-bronchoscopy as a therapeutic measure, I shall now follow the statistics of Kahler, in which he passes in review the persons suffering from foreign bodies in the time before the existence of bronchoscopy. According to Tuffier, up to 1897, out of eleven cases of pneumonia due to foreign bodies, the supposed foreign body was, on ten occasions not discovered; in four cases the operation resulted in death, and Karewsky in 1903, out of fourteen cases of thoracotomy for foreign bodies, could only point to two successes. It is therefore not to be wondered at that many authors advise, in cases of foreign bodies, the adoption of an expectant line of treatment. Thus Weist, after the study of 1,000 cases, advised that, unless dangerous symptoms supervened, foreign bodies impacted in the trachea or bronchial tubes should not be operated on, and that the surgeon should wait for spontaneous expulsion. No further remarks are needed that this aspect of the matter cannot be approved of, in view of the relative rarity of cases of spontaneous healing through coughing up, which amount, according to the statistics of Preobraschenski and Pohl, only to 218 cases out of 1,064—*i. e.*, 20.5 per cent.

The mortality from inhaled foreign bodies was formerly very large. Thus, among untreated cases, more than 770 cases were reported, according to Preobraschenski—*i. e.*, 52 per cent. This number is, however, certainly too small when it is considered how many patients die of lung complications which can be attributed to foreign bodies not diagnosed. The mortality has, at all events, decreased since the discovery of laryngoscopy, because the means of healing laryngeal foreign bodies have been improved. Whilst in prelaryngoscopic times the mortality was 41.2 per cent., it has from 1866 to 1891 been reduced to 30 per cent. The results during the next ten years are still better. Pohl, who carried on the statistical work of Preobraschenski and collected 294 cases from the literature, finds a mortality of 15 per cent. If the treated cases (530) only are considered in the series above mentioned, the mortality amounts to 20.8 per cent.

from 1890 to 1901. If these figures are compared with the bronchoscopic period, it must be considered, in estimating the real value of the progress, that the new method has only just in the present time outgrown its infancy. The method has for the most part been handled by beginners, many of whom, besides, have worked with imperfect and unsuitable instruments. In spite of this, the statistics of Von Eicken show, in a series of more than 300 cases (to the beginning of 1909) a very important decrease in mortality as compared with former times—viz., 13.1 per cent., against 52 per cent. (exclusive of foreign bodies in the larynx). In the statistics of the last two years collected by Kahler, the proportion has become substantially better; out of 291 cases, only 27—*i. e.*, 9.6 per cent.—resulted in death. A considerable number of these fatalities arose from accidental circumstances, and not a single one can be laid to the charge of the method as such. Its essential function, *i. e.*, the extraction of the foreign body—in the statistics of Von Eicken was attained in all but 11 per cent. of the cases. Kahler finds among 291 patients during the last two years only 4.5 per cent. cases of failure—"clear evidence indeed of improvement in the technic and in instruments." If in spite of this a mortality of 9.6 per cent. still remains, it must be sought in the numerous cases of lung complications engendered by the effects of the long duration of the foreign body, which remain even after successful extraction. In the future, treatment of the patient in the early stages should only be taken into consideration, as the prognosis of the acute foreign body is the only one that can be considered as thoroughly favorable.

I am, however, of the opinion that these numbers, encouraging as they are in themselves, are far from presenting a sufficient testimony of the value of bronchoscopy for foreign bodies. What formerly happened to patients like those mentioned above, coming to the clinic with suspected or obvious foreign bodies, who could not be cured without exception? Half of them died from the lingering consequences of the foreign bodies, undiagnosed. One real value of Killian's method lies in the fact that it teaches the general practitioner the importance of no longer being content to diagnose a circumscribed bronchitis, bronchiectasis, chronic pneumonia or abscess of the lungs, and of seeking the aid of a skilled bronchoscopist specialist.

2. *The mechanism of aspiration and retention.* In order that foreign bodies may enter the bronchial tree and become impacted in it, a series of mechanisms for protecting the organism must be

overcome. The first of these is the extreme degree of sensitiveness of the larynx and the epiglottis against contact, and the rapidity of the reflex closing of the glottis when this occurs. In spite of this, light foreign bodies, swept along by the velocity of the inspiratory current of air, will more often pass the open glottis if the air current is not interrupted by the epiglottis. I consider that the chief function of this structure is a protective one against the entrance of foreign bodies carried in the air; in any case, the function formerly ascribed to it—namely, that of closing the entrance of the larynx during the act of swallowing—is absolutely without foundation.

Foreign bodies will thus be drawn into the air passages if the mechanism just referred to fails, or when the sensibility is disturbed, as on taking an inspiration with the mouth full, or if the epiglottis is absent or is abnormally constituted, or when a number of these conditions go together. As a matter of fact, in most of the cases of foreign bodies where the history has been elucidated, the story is that when the mouth was full a violent and unexpected inspiration (sneezing, laughing, etc.) was taken, or, when eating with a spoon, its contents were gulped down with a sudden inspiration, or, finally that the inspiration took place unconsciously during sleep. For the same reason it may be understood that foreign bodies are generally inspired during childhood. According to the statistics prepared by Gottstein, 63 per cent. of the cases were in children; in his private practice, as well as in mine, the percentage was even considerably higher. These facts must not only be ascribed to the inexperience of children, and to the imperfectly adjusted mechanism for protecting the air passages, but also to the bad habit which children have of putting all kinds of things in their mouths. Many cases give a history that the foreign body was swallowed at the moment a mother punished her child by a blow. Similarly, it may happen through an accident, such as a fall, a fright, or any accident which causes a sudden inspiration. It has often seemed surprising that the protective mechanism at the junction of the air and food passages does not more often fail, even in the cases of adults, during the process of eating and drinking. Certainly adults also "gulp" pretty often, but the consequences are not dangerous, because fluids and soft articles of food are generally promptly coughed or spat out; even soft pieces of meat do not apparently stick, as they are never seen in any collection of foreign bodies from the bronchi that I have come across. When they are abnormally large, so that they stick

fast in the larynx or upper air passages, they cause death through suffocation. If, on the other hand, they get down straight away into the smaller divisions of the bronchial system, and remain impacted there, spontaneous recovery may still take place owing to the rapid disintegration which ensues. Substances, however, like fresh fruit, especially when unripe, dried shell fruits, and the pips of fruits with peel, often remain in the moist and warm recesses of the bronchial tree and resist decomposition so long that a serious affection of the lungs may occur. Particularly favorable conditions for spontaneous cure occur in the case of readily soluble substances—sweets, chocolates, etc., and so cases of this kind, in children, hardly ever come up for treatment. On a ski-ing tour I once inhaled a lump of frozen snow, which I was allowing to dissolve in my mouth. The momentary feeling of suffocation was rather strong, but disappeared in the course of a minute or two.

What is the situation in regard to hard-nonfriable and insoluble foreign bodies? If they are very small so that they enter the lungs suspended in the form of dust, spontaneous ejection occurs by means of the mucous secretion, ciliary action, and coughing. It is only when large quantities of dust are inhaled that definite lung affections, such as stonemason's phthisis, occur. Larger particles, up to 2 or 3 millimetres in diameter, often have a good chance, because their surface area is relatively great compared with their weight, and therefore presents a relatively larger surface to the action of the ciliated epithelium. The specific weight of the inhaled matter here plays an important part; thus, small fruit pips and the like are scarcely ever retained, whilst, for instance, a piece of tooth filling is only got rid of spontaneously with the greatest difficulty.

The typical bronchial foreign body, as observed in more than 90 per cent of cases, is after all of a firm, relatively heavy type, of a size which enables it to stick in the main bronchus or its larger subdivisions. It is in the majority of cases localized in the right main bronchus, according to Gottstein's statistics, in men in four out of five, in women in two cases out of three. It is not possible to enumerate here in detail the various kinds of foreign bodies and the frequency of their occurrence. Pieces of bone are the most frequent, after that beans and other vegetable matter with the same tendency to swell, then sharp foreign bodies such as nails and needles. Further may be mentioned teeth, false teeth, hollow bodies (fragments of canulas, pencil-covers, penholders and the like), pips and stones of differ-

ent kinds of fruits, grains of corn, small metal objects, shirt buttons, collar studs, cherry stones, prune stones, nutshells, coins, steel pens, glass beads, pebble stones, fish-bones.

How is it that these articles are retained in the lower air passages? In what does the mechanism of retention really consist? Before pursuing the question further, I should like to show here an interesting table of Gottstein's of foreign bodies which have been coughed up spontaneously. The table is arranged in typical groups, and dates from the prebronchoscopic period.

Type of Foreign Body.	Total Number.	Expectorated without Tracheotomy. Per Cent.	Expectorated through Tracheotomy Wound. Per Cent.
Rough, sharp-edged	183	39	6.5
Smooth, round	103	32	32
Bodies liable to swell	101	11	20
Pointed	45	29	11
Smooth, flat	32	37	19
Hollow bodies	25	12	8

Before coming to details, it may be asked why foreign bodies are retained at all, why the natural protective mechanisms of the organism—coughing, ciliary action, secretion—do not suffice in every case to expel the object. The physiology of respiration certainly teaches that expiratory pressure is far greater than inspiratory pressure. In a case of forced expiration it amounts to 85 to 100 millimetres of mercury; in the case of reflex expirations such as coughing and sneezing, it is distinctly higher. A forced inspiration, on the other hand, registers a pressure of about 50 millimetres mercury.

It would naturally be expected that every foreign body would be expelled by the cough which it naturally provokes. How often this really happens is not known; in any case, on closer observation, a succession of mechanical forces may be observed which afford some explanation of the retention which so often occurs. In the first place it must be mentioned that the inspiratory force with which a foreign body is drawn into the bronchial tree is aided by two very material factors. The one is that the direction coincides with that of gravity, and the other the suction-tube action. If a projectile is drawn into the wider end of a conical tube with a diminishing lumen and cannot pass through the narrow end, then it must wedge itself in with the whole energy that it has acquired on the distance traveled, and it is out of the question to displace the projectile with an equal air pressure acting from the narrow end. The less energy that is expended by the foreign body in overcoming angular turnings in the bronchial tree, the more powerful will this suction action become. In every case the foreign body must come to a place in the main path where it becomes more or less firmly impacted, un-



less it happens to be of such a shape or size that it cannot penetrate at a point of division into the smaller bronchi, and yet, above the point of division, the bronchus is large enough to give it free room for play. In this case it is not retained in the main path, but is arrested at the point of bifurcation without losing its capability of movement. The next cough forces it upward again, and the process is repeated until it becomes impacted in another place of position. In this eventuality the likelihood of its again becoming dislodged by coughing is extremely remote. This process chiefly comes into operation in the case of large rounded objects, which offer a large surface area to the air current; pointed and thin objects come less under the suction action and also offer a proportionately smaller surface to the current of air which is trying to expel them. The fact that many inhaled bodies "float" must not pass unrecognized, and this is often borne out by the history. The patients state that immediately after "gulping" they experience a choking sensation, which is followed by a period of relief of varying duration. Only occasionally does the "dancing" up and down of the foreign body last for any length of time, which is explained by what has already been stated. It usually only happens when the object is conical and of such a size that it is arrested at the tracheal bifurcation or some lower point of division, and yet has fairly free play in the segment above this. Vegetable matter which swells up may become loose from one position, and float for some time before settling down again. The question may be asked, why a foreign body which begins or continues to float does not always find its way back through the glottis. This seems to depend on the fact that the glottic aperture, controlled by the vocal cords, operates like a money-box: on inspiration the glottis is widened to its utmost, on expiration it is more or less narrowed. This unfavorable condition is considerably aggravated by the foreign body itself, as the bronchial irritation to which it gives rise provokes a reflex contraction of the aperture of the glottis, which may amount to a definite glottic spasm. Cases have been recorded where an impacted bronchial foreign body gave rise to attacks of laryngeal dyspnea which lasted for hours at a time. The chief cause of the retention of foreign bodies may then be considered to be dependent on the suction action, on the momentum of the foreign body, and on the money-boxlike action of the glottis. It remains to consider what natural means the organism possesses to bring about their expulsion. The first inclination would be to mention re-

flex cough as the most important, but closer consideration will show that in man this is of very doubtful value. It has been pointed out above that at every forced expiration, and particularly at every cough, the lumen of the trachea and the larger bronchi diminishes; often in young people, and practically always in the case of children, this amounts to a total collapse. I have observed this latter phenomenon in a very large number of impacted foreign bodies; in cases where the end of the tube is not directly on top of the foreign body, this disappears at every cough, and only appears again with the next inspiration.

It is easy to see from models that when a foreign body fills the tube the success of the vis a tergo of the expiratory efforts is largely negated by this diminution in the lumen, and this is even more the case when the respiratory capabilities of the peripheral section of the lungs has been damaged. Coughing has, however, another injurious effect—it is always followed by a forced inspiration, which dilates to its maximum the lumen of the air passage; and this dilatation, in conjunction with the pressure of the inspiratory blast and with the force of gravity, provides an excellent opportunity for the farther descent of the foreign body.

In practice this gradual downward progress, owing to the valve-like action of the respiratory mechanism, must always be reckoned with. Measures such as lowering the head or inverting the body are usually applied too late to overcome this fatal tendency.

An interesting point brought out in Gottstein's statistics quoted above is that foreign bodies which swell up readily have a greatly increased chance of being expelled spontaneously after tracheotomy has been performed. I cannot bring forward any direct evidence in explanation of this remarkable fact, but I think that the explanation is to be sought in the fact that foreign bodies of this kind find their way back through the larynx with very great difficulty owing to their size. Beans, which are inspired almost without exception by children, are in themselves relatively very large foreign bodies, and become quite remarkably so on account of the swelling which takes place within them. Add to this the relative smallness of the larynx in the child, and the tendency that the subglottic space shows to inflammatory swelling, and it can readily be understood that a wide opening in the trachea forms an excellent point of exit for the foreign body if it becomes impacted. To show that such a release is directly promoted by tracheotomy, the alteration in the expectoration mechanism produced

by it must be considered. It has already been shown that the cough loses its characteristic nature of an explosion when the glottis fails to close properly, and therefore the dangerous expiratory collapse of the walls of the bronchi is diminished, although the real expiratory pressure is unaltered. The knowledge of these facts is of the greatest therapeutical importance. Another point that is noteworthy in the above statistics is the rarity with which pointed or hollow bodies are spontaneously coughed up, compared with smooth or round bodies (11 to 12 per cent. against about 33 per cent.). The explanation lies partly in the small surface area they present to the expiratory blast, and partly in their long shape. Needles, nails, steel pens and the like almost always fall with their heavy—i. e., their blunt—end foremost, until this is arrested at some point lower down. The position eventually taken up depends on the width of the bronchial lumen, and is a more oblique one, with the point of the object resting against the wall. Thus the position is a most unfavorable one for an upward movement; and even if this does happily occur, there is always a probability of a repeated arrest at the various angles in the air passages. A large number of general and special causes for the retention of "acute" foreign bodies is therefore seen to exist, and in the next section it will be further seen that the organism possesses very insufficient means for expelling "chronic" foreign bodies, or for rendering them harmless. The prognosis of the foreign body quoad expulsionem generally becomes worse from day to day. In the case of foreign bodies which are firmly impacted and obstruct the lumen, a noticeable swelling of the bronchial mucosa above the point of retention may be observed after a few hours, and this markedly increases the difficulties of artificial extraction. If the foreign body has sharp corners, so that the mucosa is torn by it at every respiratory movement, granulations appear in a few days, or, more rarely, after a week or two. These increase the degree of impaction, and also render bronchoscopic extraction more difficult, owing to their great tendency to bleed. As a further result of the inflammatory reaction, the bronchial wall may be considerably altered, and a scar tissue stenosis may form above the foreign body, and the lumen of the bronchus become almost unrecognizable. If matters progress as far as this, the organism is deprived of its last mode of action—i. e., expulsion—owing to the increasing pressure of secretion behind the foreign body. The pent-up secretion is pathologically increased, becomes purulent, and soon leads to

bronchiectatic dilatation, which, however, does not extend usually above the point of retention. A local destructive process by which the foreign body might free itself is so rare that the possibility of it practically plays no part."

The above clear exposition of Brunings as to the causes of retention of foreign bodies in the trachea and bronchi is deserving of a place in a monograph of this character. In connection with it, the writer wishes to mention some reports of very remarkable expulsions of foreign bodies which have been recorded from time to time and which tend to upset the claims of certain bronchoscopists that retained foreign bodies result fatally within two to five years. In looking over the literature it is an interesting fact that certain observers have recorded cases in which the foreign body had lain in the trachea or bronchi for from one to sixty years; all recovered after removal or expulsion. Pieces of bone, coins, pins and nails have been found in the air passages where they had remained for years without causing symptoms.

*Symptomatology of foreign bodies in the air-passages.* Usually the first symptom when a foreign body is inspired, whether it lodges in the larynx or passes into the trachea, is a severe coughing spell which may or may not be accompanied by more or less cyanosis. If the object is large, the attack may approach suffocation or even result in death before medical aid can be secured. The writer remembers the case of a drunken man who attempted to swallow a soft crab without sufficient mastication; the bolus lodged in the larynx and cyanosis rapidly supervened. Only the promptest medical aid saved his life. In another case which came under the writer's observation, a large piece of ham slipped over the epiglottis and lodged in the esophagus. If the object lodges in the larynx, the first symptom is cough, usually violent in character, followed almost immediately by cyanosis. In the case reported above of a piece of bone which lodged between the cords, the symptoms were explosive cough and marked cyanosis; after these symptoms subsided, the patient could only whisper and coughed occasionally, but, strange to say, breathing was not affected as late as four days after the accident. If the foreign body slips into the trachea or bronchi, there is nearly always a severe paroxysm of coughing, which is nature's effort to expel the offender. There may or may not be cyanosis. After the first paroxysm there is often a period of quiet, which may be punctuated with an occasional cough; there may not be any symptoms in this stage which would indicate that a foreign body has been aspirated. In

some cases symptoms are severe from the beginning, such as severe and frequent cough, cyanosis, more or less dyspnea and bloody expectoration. Paroxysms of coughing are occasionally so prolonged that the little patient is rapidly exhausted. In the next stage, which varies in onset from a few days to a longer period, there may be secretion of large quantities of frothy blood-tinged mucus or fluid, which is practically always swallowed by children and vomited in the paroxysms of coughing. One case has been reported in which repeated hemorrhages were observed until a nail which had been in the bronchus two years was coughed up. In most cases no pain is complained of; in a patient seen by the writer, pain was experienced as the result of the jolting of a sleeping car. In small foreign bodies no increase of the respirations may be noticed, but usually sooner or later this symptom is observed. In the writer's experience, inspiration is more often affected than expiration, especially in foreign bodies which have the faculty of swelling, such as beans, grains of corn, etc. Marked dyspnea is not often seen unless one bronchus is entirely cut off and in some of these cases it is surprising how well the patients breathe. Occasionally the picture presented by a swollen foreign body is distressing; the child shows all the evidences of suffocation in that he assumes a sort of crouching position, the auxiliary chest muscles are contracting, the entire chest is heaving, the alae nasi are dilated, the face has an anxious expression and the skin is blue from the deficient aeration. This stage is, of course, the extreme one and fortunately rarely seen. In nearly all cases fever sooner or later makes its appearance and when there is no history of the aspiration of a foreign body, the additional symptoms of gradual loss of weight, cough, expectoration, especially of blood-tinged secretion, progressive loss of strength, night sweats, increase of respiration, shortness of breath make a perfect picture of tuberculosis. It should be remembered, however, from a diagnostic standpoint that in foreign bodies alone, tubercle bacilli are not found in the sputum, so that the combination of a part or all of the above mentioned symptoms without the presence of bacilli should always arouse the suspicion of a foreign body. Such cases have repeatedly been diagnosed as tuberculosis and the patient given treatment for that disease. The writer has recently heard of a case in one of our leading hospitals which illustrates the truth of the above statement. A child was admitted with most of the symptoms enumerated above; she was examined and a diagnosis of tuberculosis made; X-ray pictures taken an-

tero-posteriorly threw no light on the case. After having had treatment for some time she was taken to another hospital and the Roentgenologist took pictures antero-posteriorly and laterally with the result that a closed safety pin was located in the trachea. The removal of the foreign body was followed by a speedy restoration to health. Such cases are not uncommon. In cases where the foreign body is small, quite often there may be no symptoms for a long time and in a few cases the object has remained quiescent for many years. In a case recorded by Kellock, the inspiration of a bean caused suffocative paroxysms of twenty minutes, after which there was a period of quiescence for fifteen hours; severe pains in the chest then came on accompanied by cyanosis, dyspnea and paroxysms of coughing. Chest examination showed impaired resonance, feeble respiratory murmur, deficient expansion and moist rales over the entire left lung, which indicated obstruction of the left main bronchus. In a case reported by Compared, a boy, 7 years old, aspirated a piece of husk. Paroxysms of suffocative coughing were followed by fever, chills and pain in the left chest. The paroxysms were accompanied by bloody, then purulent, fetid expectoration. As was to be expected, the X-ray picture showed nothing. When the bronchoscope was passed, large quantities of pus were found and during the examination the husk was found in the lumen of the bronchoscope probably washed up by the pus. In a case reported by Clayton, a boy, 12 years old, had chills, fever and cough with expectoration of blood from obstruction of one of the right bronchi by a peanut. Recovery without treatment of any kind resulted from the breaking up and coughing out of the particles of the foreign body. The writer wishes to emphasize the fact that too much dependence must not be put upon lack of symptoms; the most difficult cases to diagnose are those which show practically no symptoms or possibly a slight cough. In such cases if there is a possible history of the aspiration of a foreign body, the X-ray should be used, and if this fails to give information as it will in certain substances, one is justified in making a careful bronchoscopic examination.

*Physical examination.* The examination of the chest physically yields valuable information, provided the suspected foreign body is large enough to cause any material obstruction. Thus a body which swells, as a bean for instance, may practically close a main bronchus in a child, or a smaller rounded object may cut off the air from an area supplied by a smaller bronchus; in such cases it

is not difficult to determine that air does not reach the lung. In other cases where the object is small and pointed like a pin or hollow or perforated like a bead, considerable air may enter the lung so that auscultation may not be of much help as far as the mere cutting off of air is concerned. If the bronchus obstructed be very small, no information can be gotten from the physical examination because the adjacent parts of the lung undergo a sort of compensatory hypertrophy or dilatation which overshadow, so to speak, the affected area. If the obstruction is in one of the larger bronchi, according to the site and grade of obstruction, there will be dullness, diminished or absent vesicular murmur, diminished fremitus and possibly limitation of chest movement on the affected side. If the lung around the obstructed area is dilated, percussion will not give much information of value, if one find normal resonance with absent vesicular murmur and other symptoms, the presence of a foreign body is strongly suggested. If the obstruction is great, the respiratory murmur may be raised in pitch; the same thing happens if the object is a bean or a grain of corn from swelling of the body. In a case reported by Angeleis, in which the foreign body happened to be a whistle in the right bronchus, a whistling sound produced by the rushing of the air current was heard 15 metres from the chest wall. Sooner or later the presence of the foreign body will set up inflammation of the mucous membrane of the bronchus; then subcrepitant rales will be heard over the affected area. It will be seen from the above mentioned signs that physical examination is of great help in some cases and of doubtful value in others.

*Pathological changes produced by foreign bodies.*

It can be readily understood that if a bronchus is occluded by a foreign body, the adjacent and even remote lung areas will undergo a compensating dilatation with the formation of a vicarious emphysema, which is due to the yielding of the walls of the smaller bronchi, the bronchioles and the lung alveoli. When obstruction is only partial, the air passes in and distends the bronchi and fills the alveoli, but air cannot pass out as well because of the obstruction and the inflammatory swelling of the mucous membrane with the result that the walls are stretched or dilated. Soon the muscular layers of the walls lose their tone from the inflammation of the membrane and the walls themselves are weakened so that they can no longer resist the force of the air pressure. If complete obstruction occurs so that no air can get into the affected area, collapse of that part of the lung or atelectasis follows; this

is followed quickly by bronchiectasis because the inflammation extends from the membrane surrounding the foreign body to the atelectatic membrane which is still supplied with blood. The inflammatory area naturally leads to increased secretion in the collapsed lung. According to Lichtheim this form of bronchiectasis is the result of an inflammatory process within a partially atelectatic lung. If there is no inflammation, no bronchiectasis takes place and the air is simply absorbed in about 24 hours. In the beginning the inflammatory process is localized around the affected bronchus at the site of the foreign body but it soon extends to the lung vesicles, producing the essential changes of a bronchopneumonia with inflammation of the mucous membrane, localized consolidations, bronchiectasis, pleurisy, exudative or plastic, and atelectasis; the diseased process does not tend to resolve so long as the foreign body is not removed or coughed up but becomes an interstitial pneumonia with abscess formation in about 10 per cent. of the cases. The abscess may connect with the affected bronchus from the beginning of its formation or it may form at a distance and perforate into the bronchus. Cases have been recorded in which the foreign substance has been expelled with the pus during a paroxysm of coughing. One of the end products of a bronchopneumonia due to foreign bodies is the gangrenous degeneration of the inflammatory products. Such a process may affect a part of the lung previously healthy and give rise to the characteristic odor of the breath, expectoration of shreds of necrosing lung tissue and possibly hemorrhage which is present in about one-fourth of the cases and may be so profuse as to cause death.

As a result of the pleuritis, empyema may form or it may possibly be caused by perforation of the lung by the abscess or the foreign body or both. In such cases the foreign body lies free in the thorax. In one case an autopsy showed a body in an empyema thirteen years after aspiration. Pneumothorax may develop as a result of the lung perforation; the same condition may also be brought about by the strain upon the unaffected lung by violent coughing efforts in impacted foreign bodies. Usually, however, the abscess ruptures into the thorax with the formation of pyopneumothorax. In a case reported by Ast, a girl, four years old, aspirated a pebble; this was followed by adhesive pleurisy with serious broncho-pneumonia and perforation with pneumothorax on the eleventh day. When a foreign body is removed or coughed up, the pathological processes quickly clear up even though they may have existed a long time. If the

inflammatory products undergo cicatrization, there seems to be no material damage to the function of the lung. In those cases of foreign bodies in which removal was successfully accomplished after the lapse of years, the patients have made excellent recoveries from so-called tubercular infections.

*Diagnosis of foreign bodies.* In arriving at a correct diagnosis without the aid of the *x*-ray, the history is of the first importance. In most cases occurring in children, the mother or the nurse is usually able to give a definite history of the foreign body's having been "swallowed." The mother has seen the child place the object in the mouth and before she had time to remove it, symptoms of coughing, choking, or cyanosis have appeared. With such a history in children, there is a strong likelihood that a foreign body has lodged in the respiratory tract or in the upper end of the esophagus, for pressure against the trachea in this location may cause the symptoms enumerated above. In older children, history may not be of any assistance, for the child with the natural fear of having an operation will not give any information of having aspirated a foreign body, especially if it is so small as not to cause immediate or prominent symptoms. Adults will as a rule give a very definite history of what has happened; if the symptoms are alarming, as is often the case, they immediately consult a physician. In some cases, however, the foreign body slips between the vocal cords and does not cause much trouble, especially if it is small, and here history does not help in the diagnosis. It is probably true that the majority of foreign bodies do not cause severe symptoms at the time; the lung conditions which come on some time later are serious. In adults it will be found as a rule that the patients had the object between the teeth and in attempting to talk or with the desire to cough or sneeze, it disappeared down the throat. If pronounced chest symptoms are present, one is justified in making a bronchoscopic examination. In those cases in which the foreign body is very small and no definite history of having "swallowed" it can be obtained, a probable diagnosis can be made from the one-sided chest symptoms which are almost sure to come on sooner or later.

*Prognosis of foreign bodies.* Though foreign bodies in rarer cases may remain in the respiratory tract many years without causing serious symptoms, patients do not often live longer than two years without serious impairment of health. In some cases the patient succumbs quickly to septic pneumonia. The writer knows of a case in which pneumonia killed in three weeks after the aspiration of

a peanut. Since the introduction of bronchoscopy, the outlook in these cases is much more favorable than formerly. If the bronchoscopist can get the patient immediately after the aspiration of the foreign body, removal is not attended with great difficulty as a rule; if, however, septic symptoms have developed from the prolonged presence of the object, the prognosis is worse. It may be said that as a general rule the prognosis of foreign bodies is very good, provided the patient falls into the hands of a skillful bronchoscopist. In a few cases of small, straight pins, attempts at removal will not be successful because the object passes down into a tertiary bronchus or even lower, where it cannot be reached.

*Indications for tracheo-bronchoscopy.* 1. Foreign bodies, if known to be in the respiratory tract, or, if from the symptoms are suspected, should demand an immediate bronchoscopy. The operation is comparatively safe in skilled hands, and it is far better to make the examination and find nothing than to remain in doubt. 2. Obscure dyspnea. Any difficulty in breathing, which cannot be explained by other causes, calls for a bronchoscopic examination. The different pathological conditions which may lead to dyspnea have been enumerated above and need not be repeated here. In one interesting case of dyspnea in a child, Jackson found enlargement of the thymus gland, the removal of which cured the patient. 3. Obstinate cough. The writer makes it a rule to examine the trachea and bronchi in every case of persistent cough which has not yielded to the usual remedies. Cases have been mentioned above which show the importance of routine examination. 4. Spasmodic asthma. The usual methods of treatment for this disease are so hopeless that the writer believes bronchoscopy should be tried in every case which does not yield to treatment. Statistics show that it offers the only hope in many cases. 5. The removal of small tumors of the trachea and bronchi and specimens from large tumors for microscopic examination. These operations can be performed at the time that the diagnosis is made. The writer always has forceps handy in every bronchoscopic examination; in a few cases this precaution has saved the necessity for a second passage of the tube. 6. In the treatment of stenosis of the trachea and bronchi. It is not necessary to emphasize the ease with which such conditions can be treated through the bronchoscope. Conditions which formerly were necessarily fatal because there was no way of reaching them are now amenable to successful treatment. If the stenosis cannot be cured, the life of the patient

can often be prolonged some years. 7. Jackson has given another indication in the removal of thick secretion in certain cases. Adults are usually able to cough secretions up, but in children, weakened by illness, excessive or thick secretion will cause them to drown in their own secretions, according to Jackson. In these cases, bronchoscopy is particularly valuable for getting rid of this danger.

*Contra-indications to tracheo-bronchoscopy.* These are practically the same as for direct laryngoscopy and will not be repeated here. It goes without saying that one should be even more careful in his selection of patients for bronchoscopy because the examination is longer and a greater strain on the heart and blood vessels than direct laryngoscopy, which takes only a few minutes in most cases.

*Dangers of tracheo-bronchoscopy.* It may be said that the examination under local anesthesia or without anesthesia of any kind is *practically* without danger. Most bronchoscopists teach that if one can get the bronchoscope in the trachea there is no danger of suffocation. They claim that the greatest danger is in passing the tube into the trachea when the patient is under general anesthesia. The writer wishes to say that he considers every step of the procedure dangerous to a certain extent and that he never undertakes an examination under local or general anesthesia without seeing that a stout tongue depressor, mouth forceps and a tracheotomy set are within reach. For some years in passing the bronchoscope hundreds of times he had no trouble. Then two accidents which happened in a short period of time proved to him that one must always be prepared for any emergency in tube work. Strange to say, both of these accidents happened with the bronchoscope in the trachea in examinations under local anesthesia. They were so sudden and so unusual, they will be described. In a nervous girl, 25 years old, there had been a stubborn cough and expectoration of long standing. Nothing was found in nose, throat, or lungs to account of the trouble, so a bronchoscopic examination was decided upon. At the Presbyterian Hospital, after a hypodermic injection of morphine (1/8 gr.) and atropine (1/150 gr.), she was examined in the sitting position under alypin anesthesia. The larynx was large and the bronchoscope was passed without difficulty. Aside from slight nervousness the patient stood the procedure well. The writer had located the diseased condition in the trachea and was preparing to make an application of nitrate of silver when, without warning,

the patient began to shake and became cyanotic. It looked as if she were having a nervous attack and, if the tube were removed promptly, she would recover immediately. When the writer attempted to withdrawn the tube, he found that the patient had shut down on it with her teeth. He called to her to open her mouth, and when she did not do so, he realized that she was unconscious. In the meantime she was becoming more and more cyanotic. It was a difficult matter to hold her head back; Dr. William Caspari, who happened to be present, rushed up and forced her mouth open so that the tube could be withdrawn. The patient was then lowered to the floor, as blue as indigo, without pulse or respiration. To all appearances she was dead. Artificial respiration was resorted to and strychnine, whisky, and digalin given hypodermically. With this treatment the patient slowly rallied and in an hour was almost in a normal condition with the exception of weakness which kept her in bed two days. Had it not been for the prompt assistance of Drs. Caspari, Reckard, and Dodd, recovery would not have been possible. Careful inquiry failed to bring out similar attacks. The patient had a spasm of all the chest muscles, which entirely shut off respiration. With the tube in the trachea, it is scarcely possible that suffocation could have been caused by anything else.

The second case was a man who had submitted to bronchoscopy a number of times without difficulty of any kind. He was of a phlegmatic temperament and did not mind the use of cocaine in more than the average quantity. On one occasion when the 9-millimeter bronchoscope was in his trachea, he suddenly fell off the stool and became cyanotic. As in the first case, unconsciousness came quickly. In this case there was a tracheotomy wound and he was never in the condition of the first patient. He was placed on the floor, with pulse and respiration gone. The same measures were adopted as in the first case and he soon recovered consciousness. He was put to bed and the next day was perfectly well, but could not recall anything that had happened. In both of these patients the tube was in the trachea and both were breathing naturally and were apparently in good condition when, without warning, the chest muscles seemed to become paralyzed, the pulse stopped almost instantly and extreme cyanosis came on. Both patients looked as if they had lost all oxygen in their lungs in the space of a minute. The writer has never been able to explain the conditions to his own satisfaction. Both patients looked as if they were dead and only the promptest work saved their lives. Since these accidents a



bronchoscopic examination is never undertaken by the writer without having everything handy.

*The value of the Roentgen ray in diagnosing foreign bodies.* While *x*-ray pictures are of great value in foreign bodies in the trachea and bronchi, it must be emphasized that this method has its limitations. There are many substances which cast no shadow in the *x*-ray picture, and it has probably been the experience of all bronchoscopists that occasionally false shadows will be interpreted as foreign bodies. In the writer's experience only an expert Roentgenologist can read pictures intelligently. Killian's statistics show that a little less than half of all foreign bodies will be seen in the *x*-ray picture. Practically all metal objects will be seen; stone, glass, mineral, porcelain objects will generally be recognized; bones, teeth, bone buttons are seen in a little more than half of the cases; nutshells, cherry-stones, plum-stones, horn, horn buttons, etc., are generally recognizable; pieces of meat, or fruit, berries, soft fruit kernels, organic substances are not recognizable. On the other hand, Burger reports 100 foreign bodies, 78 of which were located with the *x*-ray. It is quite probable that a careful observer like Killian is correct in his estimate. When pictures are made all clothing should be removed from the chest because pins, buckles, etc., in the clothing will lead to false conclusions. In restless children and patients with marked dyspnea, the fluoroscope is of great value, because, through it, moving objects can be seen.

In a few cases the fluoroscope has been used as a means of directing the forceps to grasp the foreign body, and some operators seem to think that it is more useful in selected cases than the lighted bronchoscope. The straight method of examining the larynx is so simple that the writer does not think it necessary to take a radiograph in suspected cases of foreign body in the larynx. If, however, edema or swelling prevents a good view, the picture is of value. Further down the picture should always be taken, because in some cases the nature of the object is not known and even if not visible itself, there may be inflammatory changes which will help in the diagnosis. In conclusion it may be said that radiography is very valuable when it gives a positive result, but of no value when the result is negative.

(To be continued.)

It is wrong to perform any radical operation for an ulcer of the tongue without preliminary microscopical examination. Clinical symptoms, no matter how typical, are often misleading.

## A METHOD OF LUNG DECORTICATION IN CHRONIC RECURRING EMPYEMA.

VINCENT ANTHONY LAPENTA, M. D.,  
INDIANAPOLIS, IND.

The problem of dealing with empyemas of the recurring type has for many years taxed the ingenuity of surgeons the world over.

The injection of foreign substances to obliterate the large suppurating cavity has been tried, only to be abandoned as a failure. The injection of numerous substances in the hope of closing the cavity by adhesions, has also been given up, as it always failed to give satisfactory results.

Estlander and Schede employed as a radical measure, in obliterating the cavity of the pleura, the resection of ribs, usually 4 or 5, and, subsequently sinking the soft parts against the collapsed lung.

The factors preventing the closing of the suppurating pleura are chiefly the thickening and hardening of the pleural membranes.

Proliferation of inelastic connective tissue makes of the visceral pleura a very unyielding wall, effectually preventing the lung from expanding and obliterating the cavity.

It can be easily understood that the injection of any substance can never bring about a closure of the cavity. The Estlander and Schede operations are exceedingly objectionable, in that they deform the chest to a horrible degree and because they perpetuate the collapsed condition of the lung.

An operation that would both positively cure the chronic empyema and at the same time restore the lung to function can certainly be considered ideal. The attempts to evolve this ideal have been numerous and have in a general way been successful, some more than others. The main objection has been the somewhat high mortality and the frequency of lung laceration and perplexing hemorrhage attending some of the methods in vogue.

De Lorme and Biondi in the operation of decortication employ a large thoracoplastic window through which they decorticate the underlying collapsed lung of its thick binding pleura, by incising and carefully tearing it off with the fingers. Usually the lung quickly expands, filling the cavity, and the bleeding is more or less insignificant, but it does happen, not infrequently, that the lung fails to expand quickly and sufficiently and then we have to contend with a large bleeding area, which unkindly responds to our efforts.

Lund, who has given the subject of lung decortication a great deal of attention, employs the rib resection to secure the route of approach to the lung

and peels off the pleura very much after the manner of De Lorme; but he takes extreme care in freeing the lung from any adhesions that may be preventing expansion, and does not hesitate to resort to packing of the cavity, relying on the lung exercises to complete the expansion, reducing the packing day by day and thereby securing a gradual distention.

The extensiveness of these methods and their attending high mortality, led me to evolve a more simple and less formidable procedure.

A thoracoplastic window of moderate size is made and the most collapsed portion of the lung is sought. A longitudinal incision is made over this area through the thickness of the pleura and with the aid of my especially designed spatula, the pleura is detached from the lung proper for an area of 3 or 4 inches, but is not stripped from the lung.

The adhesions between the visceral and parietal pleura must be separated. This being done, the entire pleura covering the collapsed lung is then incised by numerous cuts throughout the collapsed portion and detached as before by the aid of the spatula and finger but not stripped off and removed.

The expanding lung pressing against its own visceral covering will thus securely prevent the bleeding that is so prominent with the other methods. At the same time the expansion is not all retarded by the formation of an intrathoracic clot, as often happens in the cases in which typical decortication is done. The liability of infecting the lung tissue is with this method obviously diminished and principally the adhesions between lung tissue and parietal pleura are effectively prevented.

It is these adhesions that give the patients cured of empyema the dull persistent pleuritic pain that annoys them almost constantly.

In avoiding the decortication proper and its attendant bleeding the shock is very much minimized and the mortality diminished.

The after-treatment in these cases is no less important than the operation. Breathing exercises are very essential and should be instituted as soon as the wound is healed. The two-bottle apparatus is by far the most simple and effectual means of carrying on the lung gymnastics.

The liability of pneumothorax occurring in these cases, either at the operation or in the first few days following it, is less than in the ordinary rib resection for drainage, as there is with decortication practically no cavity that may fill up with air.

In all cases that I have applied this type of decortication the results have been excellent. I wish to

make very plain that the results that I have obtained with the method of De Lorme and Biondi have been equally as good as with my own method. The only points of preference that I could claim for the procedure here advocated is that it diminishes the shock, prevents profuse bleeding, lessens the liability of infection and thus lowers the mortality rate of a formidable operation.

There is a class of cases where my method would prove insufficient.

Where the hyperplasia of the pleura is advanced to such a degree that the thickness of this membrane is of one inch or more, I believe that the radical decortication, by De Lorme's technic, is the procedure of choice. For the control of the hemorrhage, I advise that the tamponade be made very loosely, and removed on the next day. Secondary bleeding, if it occurs, will, in most instances, be very insignificant.

Lung decortication, when properly carried out, is the only positive remedy we possess in the radical cure of chronic recurring empyema.

#### A SIMPLIFIED APPARATUS FOR PERFORMING PYELOGRAPHY.

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The cognizance of the exact anatomical and pathological state of the kidney and the ureter before operation is of such vital importance that of recent years Voelcker and von Lichtenberg were led to devise a method for obtaining the outline of these two urinary structures by filling the renal pelvis and ureter with a solution opaque to the X-rays and then taking a radiogram. The agent in common use in carrying out this procedure is collargol in solutions varying from 5 per cent. to 12 per cent., depending chiefly upon the corpulency of the individual—very obese patients requiring more concentrated solutions than thin subjects. It still remains a disputed question among urological authorities as to whether or not collargol *per se* exerts any harmful effect upon the kidney. Braasch, of the Mayo Clinic, who has probably done more of this work than any other American urologist, recently reported a series of 1,000 cases in which pyelography had been performed without one fatality or permanent injury.

It seems hardly necessary to repeat here that, in performing pyelography, the *gravity method* of employing collargol (and solutions of similar opaque

agents) should *always* be the one of selection. Owing to the fact, however, that several articles have appeared in the literature recently criticising this diagnostic procedure as being not without dangerous sequelae, it is only fair to state that in the majority of cases in which disastrous results ensued, the injection with a hand syringe plus pressure was the method employed, and where the injection under pressure was not the method followed, it could not be proven that the kidneys were not irreparably damaged before the collargol was used. Straussman has contributed an excellent paper on this subject, in which he has shown that the introduction of collargol solutions *without pressure* would cause no deleterious changes in the kidney. His work has recently been confirmed by the experimental work of Eisendrath and Schnoor; their results demonstrating that the injection of collargol with the ordinary gravity method has practically no bad effect upon the renal parenchyma.

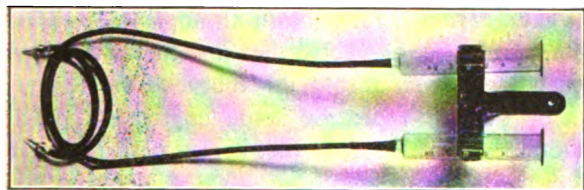


Fig. 1.

Pyelography should always be undertaken cautiously. The procedure is accompanied with a certain percentage of danger in the hands of the inexperienced and should therefore be entrusted only to those thoroughly familiar with the technic of this operation. Furthermore, it had better be employed only by those in a position to practice it assiduously in carefully selected cases, that is to say, in cases in which an exploratory operation would otherwise seem necessary. It is probably better to inject only one kidney (the affected one) unless a bilateral condition is existent. It is certainly not advisable, as Kidd has shown, to fill the same kidney on three or four occasions with strong solutions.

A little over a year ago Thomas described an apparatus for performing pyelography and also for lavaging the pelves of the kidneys and the ureters. His instrument is a modified Boehm salvarsan apparatus, and while it no doubt proved successful in his hands, to me it presents two serious objections—first, in that it cannot be considered wholly without complications, and second, the cost of such an apparatus is no little item.

The gravity apparatus which I have devised, here illustrated, is commendable in making pyelo-

grams primarily because of its simplicity in construction and its ease of manipulation.

#### DESCRIPTION OF APPARATUS

The apparatus consists of a metal frame shaped in the form of an inverted T, the arms of the lower part of the frame being fitted with U shaped clamps which are made to hold two 50 c.c. burets. The burets I use are improvisations, being originally the barrels of two 50 c.c. Triumph syringes. These cylinders are marked in graduations of cubic centimeters from 1 to 50, so that the actual capacity of the kidney pelvis and ureter can be ascertained. Attached to the lower end of each buret is a piece of rubber tubing of small caliber, 4 feet long, and to the distal end of the tubing is attached the small metal, funnel-shaped ureter catheter tip with stop-cock combined. These tips are of such size as to fit any ureteral catheter and the corrugations which encircle these tips possess the added advantage of grasping the catheter in a firm grip when the two are connected. The stop-cock being located at the very extremity of the gravity tubing eliminates the necessity of using clamps on the tubing and thereby does away with "dead spaces" for air—an objection noted in other forms of apparatus devised for this work.

It is not the purpose of this paper to elaborate upon the technic of performing pyelography; suffice to say that in using this apparatus herewith described, I have found that for general purposes an elevation of the apparatus of 3 feet, above the body of the patient, will give perfect satisfaction for filling the renal pelvis and ureter with collargol.

The advantages of this form of gravity apparatus are: (1) the ease with which it can be manipulated; (2) the convenience of its supporting frame, which can be hung on the wall beside the operator or can be held in one hand by an assistant; (3) the facility with which it can be taken apart for cleaning or sterilizing; (4) its compactness and portability; and (5) the moderate cost of such an apparatus.

Macheca Building.

#### PITUITARY EXTRACT IN CESAREAN SECTION.

To prevent hemorrhage during Cesarean section most authors are agreed that pituitary extract is of great value. Gynecological surgeons differ somewhat as to the precise moment at which the injections should be given, but they are fairly uniform in their assertion that it successfully causes contraction of the uterus and the prevention of bleeding.—L. F. ANDERSON in *Buffalo Medical Journal*.

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**WALTER M. BRICKNER, M.D., Editor**

NEW YORK, OCTOBER, 1914.

## ANOCI-ASSOCIATION.

The profession is, we believe, quite familiar with Crile's studies of shock and the evolution from his earlier vasomotor to his present kinetic theory, with his epochal work on blood transfusion, and with his efforts to establish shockless surgery by the application of his kinetic theory in "anoci-association." His recently published book\* is a restatement of these familiar publications, as a very clear, logical exposition; and it is both important historically as a monograph and highly instructive and entertaining as a classical presentation of a surgical development that, in any event, is stimulant of clinical and physiological research.

If Crile's anoci-association fails to attain permanency in its entirety it will still have done an enormous service in impressing the importance of shielding surgical (and medical) patients from those unfortunate psychic impressions which in our routine hospital work we all too often unwittingly inflict—the careless remark by the surgeon, the nurse or the interne, the heedless shrug of the shoulder or the to-the-patient very significant lifting of the eyebrow, or, what is often as bad as saying too much or saying awkwardly, the failure to explain and to reassure. Let any patient discharged from a surgical hospital ward recount his experiences. He will tell of his fright as he saw patients returned from the operating room swathed in bandages and

noisy with the delirium of semi-consciousness, of his anguish as he beheld the flurried preparations for the treatment of a sudden hemorrhage or collapse in a neighboring bed, of his fear for his own recovery when he finds that bed emptied by death, of his hours of tormenting anxiety concerning the to-him cryptic comment or the equally panic-breeding failure to comment, of the attending surgeon on his rounds. He will tell of the dread moment when, after he had been unexpectedly and painfully pricked in the arm with a needle, he was carried into the anesthetic room, amidst the disturbing sounds of hissing sterilizers and rattling basins and the confused hurrying to and fro of white-gowned doctors and nurses. He will recount that he heard someone in the hall say, "Which is that bum cardiac I've got to push the dope for?" and that then the interne rushed into the room with the black rubber bag. He will dwell on that moment of supreme and exquisite anguish when, with a despairing sense of drowning, the mask smothered his face and strange sounds came more and more distantly to his ears. He will recall, with an unpleasant expression, how disagreeably the anesthetist's fingers smelled, or even tasted, of tobacco; and he will startle you by repeating some unguarded remark made by one of the staff just before his senses sank into the abysmal depth of blessed narcosis. He will tell how he was awakened in his bed by the pressure of a large mountain balancing on the pit of his stomach, and the noise of ten thousand assorted devils beating an anvil chorus in his wide-open calvarium!

Few hospital patients escape these or other distressing experiences. Most patients are able to survive them cheerfully—else our highly cultured nations would not now have soldiers to shoot one another and, being wounded, to return and shoot again. But not all men and women are so phlegmatic or so well prepared for such a hospital ordeal that they can pass through it unharmed. On the timid and sensitive these psychic traumata sometimes work serious, even permanent, injuries. It is not hard to believe that occasionally, at least, they may be contributive to surgical shock and that they may oftener add to or originate a post-operative neurasthenia. Irrespective of these sequelae, however, Crile's effort to minimize, in surgical work, all physically painful contacts, is an humane example that all hospital physicians ought to follow.

Beyond this it remains to be demonstrated whether Crile's operating details of technic in anoci-association will permanently survive as a means of preventing surgical shock, scientifically considered.

\*Anoci-Association. By Crile and Lower. See book reviews, this issue.

The necessity to avoid shock, of infiltrating the line of incision with novocain solution, and of blocking off the wound area, at the conclusion of the operation, with quinine solution, it would be as unfair to deny without thorough trial as it would be unwise to endorse without trial. We may meanwhile, however, accept Crile's published results as suggestive, at least, of the value of these procedures.

Nerve blocking in anoci-association Crile bases on the laboratory findings that underlie his kinetic theory, viz., the morphologic changes in the cells of the brain, liver and suprarenals that follow traumatic, emotional, anaphylactic and other varieties of "shock." This "histologic pathology of shock," as well as the routine nerve blocking based upon it, has not been verified, we believe, by others. That gentle manipulations and sharp dissection should be employed instead of rough retractions, tearing and pulling, no surgeon will dispute, however, on either practical or theoretical considerations.

It is hard to escape the impression that, as in his earlier studies of shock, Crile's enthusiasm leads him to explain too many things by a single theory. Thus, to explain post-operative pneumonia, he says:

Many theories have been advanced to account for the more frequent occurrence of pneumonia after operations in the upper abdomen than after operations in the lower abdomen, or on the extremities. That pneumonia is not due to ether alone is proved by its occurrence after operations under local anesthesia; that it is not due to infection alone is shown by the fact that it occurs frequently in connection with uninfected as with infected wounds; that it is not due to emboli or thrombosis alone is evident since superficial wounds are rarely followed by pneumonia.

The clue to the real cause was found in a comparison of the post-operative behavior of patients operated upon under the old nocuous technic with patients operated upon under anoci-association. After the nocuous operation the wound is tender. Now the upper abdominal muscles have especially important respiratory functions. In each respiratory movement these powerful muscles pull on the stitches which hold together the divided wall. The exquisite pain produced by the respiratory pull causes an inhibition of the muscular contraction on the side of the incision, or on both sides of the incision, if it be median. As a result, the excursion of the lower chest wall is diminished, so that the lower lobes of the lungs cannot be filled completely. That a lesser exchange of air in the lower lobes predisposes to pneumonia is proved by noting the predisposition to pneumonia in cases of localized pleurisy, in which the pain causes an inhibition of free excursion in the part of the chest which is involved. The resultant pneumonia occurs in that portion of the lung whose free action is inhibited. After gall-bladder operations pneumonia begins, not in the left, but in the right lobe, whereas, were the pneumonia embolic in its origin, the lobes would fare alike.

The diminution of the number of cases of post-operative pneumonia since the adoption of the technic of anoci-association is the final proof of the reasoning as to its cause. Because of the lack of tenderness in the field of operation produced by the technic of the operation itself, and by the post-operative nerve blocking, there is diminished or no inhibition of the respiratory excursions. This also without doubt explains the reduced mortality of operation for umbilical hernia performed with the transverse incision. (Mayo.)

This *post hoc* argument is specious but not convincing. Even if it be true—and at this writing we are not sure that it is true—that pneumonia after gall-bladder operations always begins in the right lobe, this extremely simple explanation leaves much to be explained.—W. M. B.

## LETTER TO THE EDITOR.

### WHY LIGATE THE ROUND LIGAMENTS IN HYSTERECTOMY?

COLUMBUS, OHIO, September 15, 1914.

To the Editor:

In your August issue, under "Surgical Suggestions," you have this three-line item: "In typical abdominal hysterectomy only three ligatures on each side are needed, viz.: the ovarian vessels, the round ligaments, and the uterine vessels."

I have performed several thousand abdominal hysterectomies. During my early work I followed religiously the directions laid down in the text-books, but a little later, in studying the anatomy of the parts more carefully, I found that the artery of the round ligament runs from the uterus outward, and that there is therefore no need of any ligature on the round ligament. For many years, therefore, I have simply ligated the ovarian artery, then cut boldly across and dissected down until the uterine artery is reached, which is caught and ligated. In the typical operation this is all that is needed on each side, but occasionally an irregular vessel will spurt, which, of course, must be looked after.

I have demonstrated this absence of hemorrhage many scores of times to visiting surgeons, and have written about it on a number of occasions, but all the text-books have these ligaments carefully ligated in their pictures and text, and I suppose the error will continue indefinitely.

Very respectfully yours,

J. F. BALDWIN, M.D.

## Surgical Suggestions

It is far better to introduce a non-metallic catheter into the bladder with forceps than with the fingers, however carefully one may "scrub up."

Speed is of great importance in thyroidectomy for exophthalmic goiter, but also important is deliberation in so placing the ligature around the inferior thyroid vessels that the inferior laryngeal nerve is not included.

A convenient means of protecting the hand from soiling during a rectal examination consists in passing the index finger through a small opening in a square of gauze and applying a rubber cot pulled down over the gauze at the base of the finger.

# Surgical Sociology

Ira S. Wile, M. D., Department Editor.

## WAR THOUGHTS.

The war of nine nations still rages. The forced marches, the storming of citadels, the destruction of railroads, the burning of cities, the capture of cannon, the rescue of the wounded, and the burial of the dead continue to yield their columns to the daily press. Disease, disability, and destruction accompany the cohorts of the marching foes, regardless of uniform, flag, or form of government. The cost of this momentous struggle has been estimated at from twenty-five millions to fifty millions of dollars a day. Such theoretic approximations include the cost of destruction of towns and help to the poor further impoverished through war.

The American Civil War cost \$8,000,000,000. Approximately 900,000 lives were sacrificed from wounds and disease. The Franco-Prussian War cost \$3,000,000,000, the Russo-Japanese War cost \$1,735,000,000.

The mere citation of these stupendous figures fails to indicate the social loss attendant upon the warring nations. The cost of slaying an individual man in battle has been reckoned by Dr. Trueblood as averaging \$3,677, utilizing the figures available since the beginnings of authentic history.

The efforts of modern medicine have been directed toward the conservation of human life and the protection of the race against the invasion of pathogenic foes. The cost of saving and protecting humankind from unnecessary death, preventable accidents, needless mutilations, and violent deaths is an insignificant figure, particularly when contrasted with vast expenditures required for the forces of destruction.

It is unfortunately true that the industrial army is battling against unnecessarily destructive conditions so that to-day probably 35,000 American workmen are killed yearly by industrial accidents. The endeavor to stem this torrent of needless disaster is constantly increasing. It may seem futile to concentrate effort, attention, and money in limiting accidents and deaths while the example of foreign nations in ruthless destruction appears to be the dominant feature in the present world history.

As a neutral nation, our efforts must be devoted to the preservation of our citizenship. The allies of peace and prosperity must redouble their vigor to maintain the welfare of the community. The ensuing year will be exceedingly enervating owing to the indirect influence of the war. With the practical halting of 60 per cent. of our exports and imports, the economic situation in this country is already going through a critical period. Strong governmental backing, calm, dispassionate, and clear-sighted decisions are necessary for the maintenance of financial integrity. The taxation of the community will be increased on all sides and as a result there will be a decrease in the normal funds available for charitable institutions. With the de-

pletion of business, there will be more unemployment, there will be an increase in poverty, and probably the effects of disease will be more widespread and of more serious moment than under conditions of general physical welfare. Hospitals and dispensaries undoubtedly will be called upon for additional service by those who heretofore have managed to keep above the line of medical dependence.

With the outpouring of funds for Red Cross activities in other lands, there will undoubtedly be a falling off in the gross amount of charitable funds available for distribution to institutions of all kinds including those devoted to medical and surgical relief. Judging from the slowness with which funds have been offered to the Red Cross, the American people have not felt deeply the usual call for assistance nor have they entered into it with their wonted sympathy and understanding.

In the midst of the struggle of foreign lands, it must not be forgotten that America has a duty to perform to its own citizens who undoubtedly have a greater need for relief than in many decades. The war problems of this land at peace are deeply significant and their solution will require sagacity, judgment, cautiousness, together with unusual liberality on the part of the supporters of the institutional phases of our national life.

The sacrifices in Europe upon the altar of Mars will not be atoned within a generation. The United States for a long period to come will represent the natural source of provender, industrial assistance, and financial support for the great proportion of the civilized world.

In order to maintain the position of neutral pre-eminence, in order to be of the maximum assistance in rectifying the social damages resultant from war, it is incumbent upon this country to retain the solvency of every type of industry and to maintain in a condition of practical efficiency every institution now existent for the public welfare. Medical institutions have weightier responsibilities upon them. Restoration to health must be more certain, inasmuch as home conditions will rapidly undermine health, unless it has been placed upon a sound plane. The organization of medical work, therefore, demands more system in order to promote greater social efficiency. Medical economy is not essentially medical efficiency. Economy, however, will be required in order to promote the welfare of the greatest number in view of the fact that it will be more difficult to secure the funds necessary for the ever-increasing budgets of American hospitals and dispensaries.

The few Red Cross units which have gone over to give relief to the contending armies represents the spirit of the medical profession. Medicine recognizes no nationality, nor any other of the artificial divisions made by the mind of men. It seeks to serve the world and strives to enrich it. Its constant career is a war, but it is a battle of peace and its losses largely represent the foes of mankind. Its destructiveness results in the upbuilding of nations and its defeats retard the progress of humanity.



## Book Reviews

**Anoci-Association.** By GEORGE W. CRILE, M.D., Professor of Surgery, School of Medicine, Western Reserve University; Visiting Surgeon to the Lakeside Hospital, Cleveland, O., and WILLIAM E. LOWER, M.D., Associate Professor of Genito-Urinary Surgery, School of Medicine, Western Reserve University; Associate Surgeon to the Lakeside Hospital, Cleveland. Edited by AMY F. ROWLAND. Octavo; 259 pages; 60 illustrations. Philadelphia and London: W. B. SAUNDERS Co., 1914. Cloth, \$3.00, net.

To those not already familiar with Crile's anoci-association and the studies leading up to it, we advise the reading of this stimulating, suggestive and altogether important monograph, the subject of which we have editorially considered at some length on a preceding page.

The book restates the development of the kinetic theory of shock, and describes the application of anoci-association to various operations. We do not agree with Crile that in the treatment of an appendicitis abscess the appendix should be removed only "if it be found at once," and that "if the appendix be not found readily, then its removal should be left for a second operation after the abscess has completely healed," and that "the protective wall of granulation must not be broken through, for a breach in this protective structure may mean spreading peritonitis, new abscesses, pyelephlebitis, and subphrenic abscess." We believe that, for the experienced laparotomist, the rule for these abscess cases should be always to remove the diseased appendix (the source of the infection) except in those rare instances where its removal would be too difficult or the patient's condition is too bad. When the appendix is not removed the abscess often will not "completely heal." And, what is more important, there is greater danger of new abscesses, subphrenic abscess, etc., from retaining the source of infection than from removing it even though it form part of the "protecting wall" of the abscess.

The employment of nitrous oxid-oxygen as an anesthetic is an essential part of the "anociated" operation, and Agatha Hodgins, chief anesthetist at the Lakeside Hospital, has contributed to this book an interesting and practical chapter on its technic. She and her associates and Dr. Teter have administered nitrous oxid-oxygen 34,964 times without an anesthesia fatality. To supply the hospital with the large amount of gas needed, in its purest state and, presumably, at the lowest cost, a plant was installed in the institution. A meager reference to this plant is contributed by Dr. A. R. Warner, superintendent of the hospital. No reference is made, however, to that very important consideration, viz., the average cost per operation of the nitrous oxid and the oxygen.

**The Practice of Surgery.** By JAMES GREGORY MUMFORD, M.D., Lecturer on Surgery in Harvard University, Surgeon to the Clifton Springs Hospital, N. Y., etc., etc. *Second Edition.* Octavo; 1,032 pages; 683 illustrations. Philadelphia and London: W. B. SAUNDERS COMPANY, 1914. Cloth, \$7.00.

The short preface to this edition is so clever and amusing that we cannot resist the temptation to reproduce it here in full:

"I have gone carefully through the text of this book and have revised it so far as seemed necessary to keep it abreast of progress.

"To my friends, the book reviewers, I am grateful for their kind reception of the first edition. I am myself a member of the brotherhood, for I have been a reviewer for many years. I have read seventy reviews of this book, and feel that it has found favor beyond its deserts. The reviewers do not always agree with me, but, then, they do not agree with each other. Nevertheless, most of them have read my first preface, have understood my purpose, and have dealt with the volume in courtesy and frankness."

The last sentence is a fine bit of irony, for some of the reviewers of the first edition, and an adroit challenge to the reviewers of this edition. We accept the challenge without any blush for our "past performance," for in the preparation of our critique of the first edition (A. J. S., February, 1911, page 72) we did far more than merely "read the first preface." For this review we have carefully compared the two issues, the preface to the second of which is so cunningly designed to afford the reviewer no information.

In this comparison we note, indeed, revision of the text here and there, but no alteration requiring special note. About fifteen pages have been added, including several plates borrowed from Mayo. We would repeat the praise we bestowed on the first edition, and some of the criticism; and we commend this interestingly written and modern work to the seeker of good books on surgery.

**Diseases of Bones and Joints.** By LEONARD W. ELY, M.D., Associate Professor of Surgery, Leland Stanford Junior University, San Francisco, Cal. Small Octavo; 218 pages; 95 illustrations. New York: Surgery Publishing Co., 1914.

This book bears many marks of originality. In the first place, we mention the subject itself, combining, as it does, both orthopedic and surgical aspects. As far as we are aware, there has been thus far no systematic attempt to discuss the maladies of these correlated structures. In the second place, it is refreshing to find a work dealing with bones and joints which aims to build a definite concept of the diseases to which they are subject from the pathological viewpoint. Ely's extensive and original studies on the pathology of joint diseases, especially tuberculosis, are well known, and have been fruitful in modifying our concept of these diseases. Pathological studies upon joints have been altogether too meager, and as Ely well emphasizes, pathology forms the keynote to the understanding of all joint diseases. In this work, the pathology is entirely the result of the author's labors. Finally, the text reveals originality in that it reflects largely Ely's own views. The reader is not left in doubt as to which method of treatment it is recommended to pursue, although in many instances, the views of others are set forth with admirable critique.

The text is concise and neatly systematized with numerous subheadings. The author's style is refreshingly conversational and unambiguous. The illustrations, especially those representing microscopic sections, are well executed and form a valuable feature of the book. The text is interspersed with numerous references.

**A Clinical Study of the Serous and Purulent Diseases of the Labyrinth.** By ERICH RUTHIN, Privatdozent in the Otological Clinic, University of Vienna. *Authorized translation* by HORACE NEWHART, A.B., M.D., F.A.C.S., Instructor in Otology, University of Minnesota; Otologist and Rhinologist, Northwestern Hospital; Fellow American Academy of Ophthalmology and Oto-Laryngology, etc. Small octavo; 232 pages; 25 illustrations. New York: REBMAN COMPANY, 1914.

The translation of Ruthin's valuable work has brought one more of these technical monographs to our attention. It is a practical treatise on the subject which should prove a useful guide in dealing intelligently with those cases of labyrinth involvement that are constantly appearing in practice but which until very recently have too often been unrecognized or misinterpreted.

The first chapter deals with functional examinations of the labyrinth and explains in detail the various tests, comparing their values. The second chapter takes up diseased conditions of this organ with treatment. The operation on the labyrinth is here dealt with in detail, the excellent text being profusely illustrated with *recognizable* drawings. The next three chapters deal with special phases of the subject and the volume concludes with a review of one hundred and eight cases.

An important monograph like this is welcomed by the specialist and should prove of interest to men in other fields of medical work.

**Progressive Medicine.** Edited by H. A. HARE and L. F. APFLEMAN, September 1, 1914. Philadelphia and New York: LEA & FEBIGER.

This number contains the following reviews: Diseases of the Thorax and its Viscera, including the heart, lungs and blood vessels, by Wm. Ewart; Dermatology and Syphilis, by W. S. Gottheil; Obstetrics by E. P. Davis, and Diseases of the Nervous System by W. G. Spiller. As customary, these reviews of the recent literature in their respective subjects, are ably done. They reveal a wide knowledge of the best articles, careful review of the text and a sound critique.

## Progress in Surgery

A Résumé of Recent Literature.

**Diagnosis and Treatment of Hemic Infections of the Urinary Tract.** F. KIDD, London. *The American Journal of Urology, Venereal and Sexual Diseases*, August, 1914.

This paper is based upon the study of a series of cases, excluding tuberculosis, over a period of about four years. In a patient suddenly seized with pyuria and fever, the treatment should be absolute rest in bed for at least a week after fever has disappeared. The usual methods of diuresis and diaphoresis are employed. In the meantime the methods of diagnosis are instituted. First a catheter specimen is sent for bacteriological examination. The group of hyperacute and possibly fatal cases is a very small one; it is only in those very instances that a prompt nephrectomy is to be practiced, and then not until it has been demonstrated that the affection is unilateral. In the large majority of the cases the acute symptoms abate under conservative measures. When fever disappears skiagrams should be taken to exclude renal calculus, the urine catheterized from each kidney should be examined bacteriologically, and, if necessary, collargograms of the renal pelvis should be taken. At the end of another week ureteral catheterization should be again practiced to determine if the case has been cured. If still infected the catheter should be left in place in the pelvis of the diseased kidney and irrigations with oxycyanide of mercury (1:4,000) practiced at frequent intervals. Another method is to catheterize the ureter every fourth or fifth day, and wash the pelvis with a collargol solution. Very few cases fail to yield to either method of treatment.

The general treatment of the chronic cases that are left is of greatest importance, for these patients have very low tissue resistance. They must be built up and most carefully avoid overexertion. Daily bowel movements are to be insisted upon. Urotropin is administered constantly. Only 6 per cent of the cases are left uncured by this treatment. It is for these cases that nephrectomy should be reserved after the condition is proven unilateral and the opposite kidney capable of adequate function.

**The Redundant Sigmoid.** C. A. L. REED, Cincinnati, *Journal American Medical Association*, Aug. 8, 1914.

A sigmoid over ten inches in length is considered by Reed, as redundant. So far he has not seen one exceeding that measurement that was not the seat of either functional or organic disturbance logically attributable to redundancy. There may be exceptions but he has not met with them. The sigmoid is in close anatomical relation to important parts which may be affected by its increased size, hence the surgical significance of the condition. It is probably true that in the normal individual its function is to delay the too rapid transit of intestinal contents, and the tendency of increased size must be toward fecal stasis. We must also recognize that it has an active absorbent apparatus and is the seat of an abundant flora, and that toxins develop in the long-retained contents. These facts indicate its functional importance. Of the cases operated on by him in all but a comparatively few, redundancy was an important if not the sole abnormal con-

dition. These cases, he says, represent less than 50 per cent. of the cases referred to him for operation, the remainder having been treated by other methods. The symptomatology of redundant sigmoid is variable; probably the most common symptom is constipation, liable to alternate with diarrhea and associated with colicky pains. There are also more or less pressure symptoms in the prostate or ovary and elsewhere, and cystic irritation. Physical examination generally reveals dullness in the left lower quadrant. The conclusive examination is, of course, by the Roentgen ray in the hands of an expert, and Reed recommends as rules to be observed first, a complete emptying of the large bowel and which should be completely filled with the barium solution and pictures taken in the recumbent, erect and extreme Trendelenburg posture. The local sequelae are sigmoiditis and pressure lesions of other organs and the remote or systemic results are brought about through the blood and the nervous system. The toxins developed are carried away by the blood and the sensory centers are made still more sensitive by them to the pain caused by the pressure conditions. Other existing pathologic conditions are aggravated by the toxemia and several cases are mentioned illustrating this fact, such as melancholia, nephritis, nutritive and neuropsychic disturbances, etc. The situation, Reed says, may be summarized by the statement that any systemic or even local disease, deleteriously influenced by impaired nutrition, must necessarily have an important sequent relationship to coexistent redundancy of the sigmoid and colon. As regards treatment, palliative measures may be relied on in a limited number of cases to afford a *modus vivendi* without affecting the original causative condition. The methods mentioned are postural treatment with massage, laxative foods and, if necessary, mild laxatives, though it is better to get along without them, hydropathy and enemas. Contrasted with the palliative treatment are curative methods and nothing is really curative but surgery. The measures he has found effective are: sigmoidopexy, ileosigmoidostomy, cecosigmoidostomy, resection of the sigmoid and as a secondary procedure to ileosigmoidostomy—colectomy. It is important as regards sigmoidopexy, Reed says, not to stitch the sigmoid or any part of it to the abdominal wall, but that the uninking should be effected by stitching not the bowel itself but the redundant mesosigmoid to the parietal peritoneum. Where fixation methods cannot be effective, resection of the sigmoid with lateral anastomosis of the ends, or ileosigmoidostomy, or cecosigmoidostomy, after the manner of Rilus Eastman, with or without resection or removal of the large bowel, may well be employed.

**A Report of Twenty-Seven Unilateral Exclusions of the Pyloric Region, With Special Reference to Operative Technique.** WILLARD BARTLETT, St. Louis, *Journal American Medical Association*, Aug. 15, 1914.

W. Bartlett says that our knowledge of ulcer of the stomach and duodenum is so meager at present that we cannot do more than temporarily to relieve the anatomic condition which is the expression rather than the origin of the disease. Closure of the pylorus cannot protect the gastric ulcer near it even with the gastro-enterostomy, since the pyloric antrum drives stomach contents as far as possible toward the closed pylorus before letting it enter the new opening. Gastro-enterostomy alone seems to have done less good the farther from the pylorus the stomach lesion has been found. His experience with unilateral exclusion of the affected area has been in most cases satisfactory. It takes the place of excision of gastric ulcer, or pylorotomy where the latter presents extreme technical difficulties. A larger ulcer perforating deeply into the structure of the pancreas, liver or other organs is most simply treated by exclusion. Bartlett says: It prevents the gastric contents passing over an ulcer; stops pain, prevents hemorrhage and puts the excluded portion at rest, allowing the ulcer to heal, thus decreasing the likelihood of secondary cancer. Any form of exclusion of the pyloric antrum which prevents food passing over it accomplishes as much as does complete transverse division of the organ. Cohnheim teaches that the innervation of the stomach and pyloric musculatures is chiefly gov-

erned by automatic centers in the organ. This much is known although the exact action of the stomach's nerve mechanism is not understood. We cannot hope to stop secretion in the pyloric antrum by complete transverse division of the organ since Pawlow has shown that foods stimulate gastric secretion after the stomach is completely isolated from nerve connections, and hence through intrinsic ganglion by reflex nervous origin. Both the methods I am proposing are simpler, take less time and encounter fewer blood-vessels than does transverse complete division of the organ. Experimentally they produced results similar to it, while clinically they seem to have been equally successful. Bartlett's first method (cutting into the greater curvature and inverting a septum) may seem more convincing on theoretical grounds. The second is the easier to perform and is less bloody, but it violates the time-honored principle that mucous surfaces are not to be approximated. The two methods seem to have given equally good results in experimental work; the same seems to have been the case in clinical work, although this is not so easily ascertained. Bartlett leaves the reader to choose between the two, after trying them.

**The Value of Colonic Inflation in the Diagnosis of Chronic Appendicitis.** E. H. GOODMAN and C. H. LÜDERS, Philadelphia. *American Journal of Medical Sciences*, September, 1914.

Goodman and Lüders tested the value of this sign, first proposed by Bastedo, and later favorably commented upon by various writers. The method consists in inflating the colon through the rectum and noting whether the patient complains of pain in the region of the appendix; also whether any local tenderness is thereby increased. They conclude:

1. Inflation of the colon is an equivocal means of diagnosing chronic appendicitis. Some cases have negative tests and some have positive; there seems to be no constancy in the result obtained.

2. In acute appendicitis the method should not be employed. It is rarely necessary as a diagnostic aid, as the results are uncertain and the risk of injuring the intestine is too great.

3. The method should not be considered useless, however, for at times the diagnosis has been materially strengthened by its employment, and operation has later shown the wisdom of our faith in the result obtained. Inflation of the colon, however, should be regarded merely as an aid in the diagnosis, history and physical examination being far more valuable.

4. We have seen no positive reactions in normal individuals.

5. The test is in no sense pathognomonic of chronic appendicitis.

**Observations on the Pathology and Etiology of Duodenal Ulcer.** D. P. D. WILKIE, Edinburgh. *Edinburgh Medical Journal*, September, 1914.

This paper is based upon the study of 41 cases found post-mortem. In only six was the condition diagnosed.

1. Duodenal ulcer is a malady of frequent occurrence and one which often passes unrecognized.

2. Although as a rule diagnosed, a chronic duodenal ulcer may occasionally exist and give rise to none of the characteristic symptoms, the first evidence of such a "silent" ulcer being sometimes its perforation.

3. "Silent" duodenal ulcers are met with most frequently in the subjects of arteriosclerosis, and are found for the most part on the posterior wall of the duodenum.

4. Some toxic or irritative factor, usually within the abdomen and most frequently associated with the colon or appendix, is found in a large proportion of cases of chronic duodenal ulcer.

5. Probably many acute duodenal ulcers are primarily follicular ulcers from the breaking down of inflamed lymph follicles.

6. Whatever be the primary cause of a gastric or duodenal ulcer, spasm of the muscular coats of the viscus is an important factor in determining its chronicity.

7. The situation of the opposing ulcers on the anterior and posterior walls of the duodenum on the boundary zone of the areas supplied by the anterior and posterior

branches of the supraduodenal artery suggests that a common vascular deficiency rather than a contact infection accounts for the peculiar tendency to chronicity and recurrence.

8. This vascular deficiency may be due to arteriosclerosis, but probably it is usually due to spasm of the muscular coats of the duodenum induced by a slight local anæmia consequent to strain on the supraduodenal vessels, this muscular spasm being favored by the increased vagotonus and the irritable condition of the autonomic nervous system which exists in such cases.

9. The sex incidence of duodenal ulcer is to be explained on anatomical grounds. The relatively high pylorus and short fixed duodenum of the male allows of its vascular supporting ligament, the hepato-duodenal ligament, being exposed to strain, which in the female, with her relatively low pylorus and lax duodenum, is borne by the left border of the gastro-hepatic omentum and lesser curvature of the stomach.

**Are Worms, Especially the Oxyuris, the Direct or Indirect Cause of Appendicitis?** L. ASCHOFF, Freiburg. *Berliner Klinische Wochenschrift*, August 10, 1914.

This paper is a polemic against Rheindorf, who recently claimed that oxyuris is the direct cause of some cases of acute appendicitis. Aschoff claims, on the other hand, that although oxyuris within the appendix may cause symptoms simulating appendicitis (pseudoappendicitis), an acute inflammation is never the result. Pseudoappendicitis is never accompanied by fever. Therefore patients, especially children, who present certain signs and symptoms of appendicitis without the accompanying fever, should be examined with the view of excluding intestinal worms, especially oxyuris. The fissures in the mucosa which Rheindorf describes as caused by the oxyuris are regarded by Aschoff as artefacts.

**Contributions to the Diagnosis of Post-Operative Jejunal Ulcer and Ulcer at the Site of the Anastomosis.** (*Beiträge Zur Diagnostik des post-operativen jejunalen und Anastomosenukulus.*) T. BARSONY, Budapest, *Wiener Klinische Wochenschrift*, July 16, 1914.

The symptoms of jejunal ulcer following gastroenterostomy correspond exactly to those of the gastric or duodenal ulcer for which the operation was indicated; the only point of difference is that the tenderness is on the left side of the epigastrium. By the aid of the x-ray after a bismuth meal, Barsony was enabled in three cases to make a positive diagnosis. This consisted in the finding of a persistent shadow overlying the distended jejunal loop, which is not influenced by massage or peristalsis. This shadow also corresponds to the point of maximum tenderness.

**Appendicular Grafting.** N. BRAHAM, *British Medical Journal*, July 11, 1914.

A boy, aged 11, received an extensive injury of the perineum, resulting in urinary extravasation and extensive sloughing of the perineal urethra. Complete obliteration of the urethra resulted, so that all the urine passed out through a suprapubic opening which was made at the time of the first operation. After a number of unsuccessful efforts to create a new urethral channel, Braham removed the appendix and sewed this organ between the severed ends of the urethra. The appendix healed in nicely and the functional result is perfect.

**Radiotherapy in Gynecology.** (*Strahlentherapie in der Gynäkologie.*) H. MARTIN, *Jahreskurse für Ärztliche Fortbildung*, July, 1914.

A. Martin reviews the most recent advances in radiotherapy of carcinoma of the uterus. He states that in view of his own recent experience and that of the most eminent gynecologists as reported in recent literature, he is no longer skeptical as to the value of radiotherapy in cancer of the uterus. There is no doubt, he asserts, that

every variety of cancer tissue in the uterus yields to the curative influence of the ray in the course of three to five weeks, some showing a quick and others a slower reaction. Injurious effects from the ray action are becoming, thanks to the improved technic, more and more reduced. Their importance when compared to the absolute danger of the underlying disease is not to be seriously considered. In operable cases, radiotherapy is fully justified as an alternative to the radical extirpation. Further experience will teach us the best form of irradiation to adopt in the cure of cancer, whether the x-rays or the radium or mesothorium.

The final word as to the value of these therapeutic agencies must wait the observations and experiences of the coming three to four years. Only then shall we be in a position to know whether we possess in radiotherapy only a temporary measure against cancer, or whether it may prove to be the curative agency against that dread disease.

In the metropathy (metritis chronica) radiotherapy has come to have a distinct value; also in the treatment of fibromyomata of the uterus. All the applied forms of irradiation have proved of value. Hemorrhage is controlled even to the point of temporary or permanent amenorrhea and in many instances a disappearance of the growth. But as Martin remarks, we are still in need of further observation and control of the cases treated to determine especially the possibility of untoward effects of a serious nature. Meanwhile the technic for myoma has been so perfected that the mortality from the operation in the hands of many has been reduced to zero.

**Pyelitis of Pregnancy.** (*Über Pyelitis Gravidarum.*) A. BAUEREISEN, *Jahreskurse für Ärztliche Fortbildung*, July, 1914.

The mode of infection of the renal pelvis is either ascending from the bladder—a theory which Stoeckel, Opitz, Kehrer and Menge and most German authors support—or it is descending, the infection coming through the lymphatics or the blood stream into the kidney capsule and thence into the renal pelvis. The latter theory is chiefly advanced by Albarran and Zangemeister and most of the French authors. According to Bauereisen's own experience the infection is most probably in the majority of instances an ascending one. The growing uterus exerts direct pressure on the ureters, causing stasis, which is the strongest predisposing factor in infection, or by intestinal stasis develops secondary urinary infection. The bacilli coli communis is present in the urethra and bladder in 19 per cent of pregnant women. This fact alone would tend to explain the readiness of the b. coli infection. Streptococci and staphylococci are less common, while the bacillus proteus, the gonococcus and pneumococcus are also occasionally found.

In the therapy of the pyelitis, the cystoscope and the ureteral catheter are the most essential means of determining in the first instance whether one is dealing with merely stasis, or also with an infection. In mild cases of stasis without associated infection, the ureteral catheter used for diagnostic purposes may at the same time bring about a cure. Rest in bed and regulation of diet complete the recovery. If bacteria and pus are revealed by the cystoscopy, no time should be lost with conservative treatment, but as soon as possible lavage of the renal pelvis should be begun. Since Stoeckel's recommendation of this therapeutic measure most authorities have supported it. Bauereisen believes it to be the method of choice in the treatment of pyelitis of moderate severity. The proper and timely use of the ureteral catheter will not only obviate the necessity of interrupting the pregnancy, but it can also prevent those bad cases of pyonephrosis. The cases of moderate severity may be cured also, thus reducing the number of spontaneous early miscarriages.

The interruption of pregnancy, according to Stoeckel, does not relieve the alarming symptoms of the pyelitis, hence it is not to be employed. An important factor is the early diagnosis of the existing pyelitis.

In protracted and mismanaged cases of pyonephrosis neither the artificial abortion or lavage of the renal pelvis

will be of avail. In these instances the indication is purely surgical, namely, for nephrotomy or for nephrectomy.

**The Ovary in Women With Fibromyoma.** (L'ovaire chez les fibromateuses.) Mlle. DE JONG, *Annales de Gynecologie et d'obstetrique*, June, 1914.

De Jong has studied the ovaries of 13 women operated upon for fibromyomata of the uterus and has also reviewed observations on this subject in the literature. Her conclusions are as follows: 1. The evolution of the interstitial gland is very variable in women with fibromyoma, both as to the number of the atretic follicles and as to the presence of a corpus luteum of menstruation. 2. The corpus luteum of menstruation is an inconstant formation in the ovary of the fibromyomatous uterus; it may be double.

In 6 cases this formation was absent.

In 5 cases it was present (1 case had had an arphorectomy 18 years previously.)

In 1 case there was a corpus luteum in each ovary.

In 1 case there were 2 corpora lutea in the same ovary.

These differences bear no relation to the age of the patients.

At the same time these facts would tend to disagree with those theories which suppose that the ripe follicle ruptures regularly twelve or fourteen days before the menses. The corpus luteum of the normal ovary is not to be distinguished from that of an ovary in a woman with fibromyoma. On the other hand, it is incontestably true that the ovaries play a rôle in the uterine hemorrhages of fibromyoma.

**Five Cases of Pregnancy Following Myomectomy.** (*Cinq Cas de Grossesse après myomectomie.*) M. GOULLIoud, *Annales de Gynecologie et d'Obstetrique*, June, 1914.

Of 26 women in whom a conservative myomectomy was done, five became pregnant and went to term. These women were all below 40 years of age. The percentage of pregnancies in such patients would be about 20; in women over 35 years, the possibility of pregnancy after a myomectomy is very much less. Goullioud operated on young women, some of whom were still unmarried at the time of the operation. There were a few miscarriages after the operation, but these occurred in women who had previously miscarried, the cause probably being outside of the uterus. There were no fatalities during labor, the possibility of a rupture of the uterus having been prevented by a careful repair of the uterus at the removal of the fibromyoma.

In some cases, after the pregnancies, there was a recurrence of a myoma. In these instances the radical operation was then performed.

**The Use of Pituitary Extract in Labor.** D. G. MADILL, M.D., and R. M. ALLAN, Dublin, *Surgery Gynecology and Obstetrics*, August, 1914.

The authors conclude that pituitary extract undoubtedly increases the strength of the uterine contractions, the contractions being of a physiological character. The best results are obtained in the second stage and the use of the extract reduces the number of forceps cases. It is safe for the mother and at least as safe for the child as the forceps. In cases of placenta previa, it gives improved results for both mother and child if used in combination with version. It does not influence the puerperium.

**Sarcoma of the Round Ligament of the Uterus.** FRED. J. TAUSSIG, St. Louis, *Surgery, Gynecology and Obstetrics*, August, 1914.

Taussig reports his case as the sixth substantiated case in the literature. The tumors are of slow growth and not very malignant clinically. Metastases are not recorded nor have recurrences been noted. The tumors are mostly extraabdominal and usually originate in a fibromyoma. In Taussig's case there was no evidence of a previously existing benign growth.

### Calcified Fibroma Uteri Compressing the Sigmoid Colon. GEORGE DE TARNOWSKY, Chicago, *Surgery, Gynecology and Obstetrics*, August, 1914.

Tarnowsky reports a case of this kind and reviews the literature. He says that especially the subserous and interstitial varieties of fibroids may undergo calcareous changes, usually after the menopause. This late change accounts for the increase in weight and displacement of the tumor late in life. He advises early removal of all fibroids to insure the best prognosis and the lowest operative mortality.

### Dysmenorrhea Essentialis. T. J. DOEDERLEIN, Chicago, *Surgery, Gynecology and Obstetrics*, August, 1914.

Doederlein distinguishes two types of dysmenorrhea essentialis, one due to a toxemia arising from the thyroid gland, a tuberculous focus or coprostasis, plus overwork, anxiety, fatigue and poor nutrition. The other form is the psychoneurotic type more frequently appearing in affluent women. These cases are all free from anatomical anomalies. Treatment is preventive and symptomatic, although the author has had good results in both forms by dilatation and the subsequent use of sounds.

### Polypoid Chondrofibroma of the Fallopian Tube, Associated With Tubal Pregnancy. GEORGE W. OUTERBRIDGE, Philadelphia, *American Journal of Obstetrics*, August, 1914.

Outerbridge reports this case in which the microscopic examination of the tumor showed it to be a degenerated fibroma covered with tubal epithelium. It contained some hyaline cartilage. It seems not to have been a mixed tumor of embryonic origin. As the tumor almost completely blocked the tube, it seems to have been a factor in the existing tubal pregnancy.

### The Biochemical Functions of the Endometrium in the Etiology of Metrorrhagia and Menorrhagia. J. RIDDLE GOFFE, New York *Medical Journal*, July 18, 1914.

Basing his argument upon the well-known observation that menstrual blood is incoagulable, Goffe deduces that in the passage of the fluid through the endometrium a substance is generated that inhibits coagulation. Various investigators have found that the incoagulability of menstrual blood is not due to a filtering of the coagulating element from the blood, but rather to the production of an anti-body. The nature of this substance has not been determined, but in all probability it is determined by the corpus luteum, and in part by the thyroid gland. The old conception of an inflammation, an endometritis, must in the light of recent histological examination, be abandoned. For practical purposes, Goffe concludes from his argument, that the curette is of no avail in such cases. Drugs, such as Ergot, pituitrin, are also of no value. In adults, such causes as carcinoma, polypi and fibroids must be excluded. In younger patients, the indication is to increase the function of the corpus luteum and the thyroid by giving extracts of these organs. When these are of no avail, hysterectomy is sometimes necessary to save life.

### Obstetrical Paralysis. T. T. THOMAS, Philadelphia. New York *Medical Journal*, July 11, 1914.

In this very interesting communication, Thomas again argues that obstetrical paralysis is not due to injuries of the brachial plexus, as generally believed, but to posterior subluxation of the shoulder joint. Thomas sets forth many arguments to prove his contention, most of which sound very convincing. The main arguments whereby he attempts to prove his thesis are two: 1. That the electrical reactions and tests for sensation are normal in these cases. This would not occur if the fibers of the brachial plexus are torn. 2. Treatment directed to the reduction of the posterior dislocation results in cure.

### The Clinical Aspects of Renal Infection. D. EISENDRATH, Chicago. *Interstate Medical Journal*, July, 1914.

1. Infection of the kidney may take place by one or

more of four routes, a combination of several routes not being an exception. The first is the blood route (hematogenous); second, the so-called urogenous, along the interior of the ureter, the micro-organisms being carried up into the pelvis of the kidney with the stagnant urine; third, the lymphogenous route, that is, from the lymphatics of the bladder to their communication with the lymphatics of the ureter up along the latter to the pelvis and into the lymphatics of the kidney. From the writer's observation this is not at all a rare form of infection. The fourth, the connection of the lymphatics of the colon with those of the kidney. This route has not been proved, but seems a plausible explanation for some of the cases, especially those occurring in infancy and childhood.

2. Many of the cases of renal infection are dependent upon the presence of a calculus blocking the ureter, oftentimes the pelvic portion, or at the ureteropelvic junction. For this reason a routine examination with the x-ray of every case of renal infection should be made, if possible.

3. Many of the cases of renal infection are masked by the pseudomalarial chills and fever, or the typhoid-like course of the temperature. In every case of temperature in which a negative Widal or malarial test has been made one should always think of the kidney as the possible source of the infection.

4. The symptoms of renal infection are oftentimes so indistinct that the kidney is not thought of as the source of obscure fever. Tenderness and other local signs are not infrequently absent, even though the general symptoms are of the most septic character.

5. Both acute and chronic hematogenous and urogenous forms of infection may be unilateral, and their early diagnosis may greatly assist in removal or other methods of treatment of the infection.

6. The best method of eliciting tenderness over the kidney is either by bimanual palpation or by palpation at the costovertebral angle. The most reliable evidences clinically of renal infection are, however, those obtained by the use of the cystoscope and the ureteral catheter.

7. Pelvic lavage is of more assistance in the cases of chronic than those of acute infection of the renal pelvis. At times in the pyelitis of pregnancy and of the puerperium, if they do not yield to conservative treatment, the pelvic lavage will often cut the disease short.

8. Reformation of renal calculi in kidneys which are the seat of chronic colon bacillus infection is not infrequent, and must be considered in giving the prognosis of any case in which a stone has been removed, where the kidney is the seat of a long-standing infection. The calculi will reform as long as infection is present. Not infrequently such infection is bilateral, necessitating the avoidance of a nephrectomy on account of the advanced condition of the disease in both kidneys.

9. In children with high temperatures, especially of the remittent type, the kidney should be thought of immediately as the possible source of infection.

10. In the most severe types, both of urogenous and hematogenous infection, the general septic symptoms in the form of bacteriemia may mask the local condition completely. The longer the obstruction of the urinary passages exists, with infection of the kidney, the more advanced are the pathological changes in the latter.

11. Primary nephrectomy, if the opposite kidney is capable of doing the work of both, is to be preferred in advanced cases of renal infection to a conservative method. A secondary nephrectomy is exceedingly difficult, on account of the very firm adhesions and the danger of hemorrhage. The term pyelitis is often mistaken in its application. The majority of cases belong to the type of pyelonephritis, both the parenchyma and the pelvis of the kidney being involved.

12. Cases of mixed infection of tuberculosis and pyogenic micro-organisms are very difficult to diagnose, and must be thought of in the majority of cases of renal infection of the chronic type. The bladder symptoms, which are often so marked in the ordinary type of tuberculosis, are entirely absent or are not present in sufficient degree to lead one to suspect the presence of tuberculosis.

13. Conservatism should be the rule in all cases of renal infection except those of the hyperacute type. In the latter, nephrectomy should be performed as early as possible.

In the acute form of renal infection, whether hematogenous or urogenous, one should at first try the conservative measures outlined above. Even a nephrotomy with decapsulation of the kidney and the puncturing of the little abscesses scattered over the cortex may save the kidney. One should not, however, wait too long with such conservative measures, and if a prompt response is not obtained, nephrectomy should be performed at once.

**A Treatment for Acute Gonorrhea in the Male.** (*Eine Behandlungsmethode des Frischen Trippers der Männer.*) PROF. L. MERK, Innsbruck, *Medizinische Klinik*, July 26, 1914.

The author presents arguments in favor of the use of silver nitrate in preference to the organic silver combinations. He believes that not only the Ag. radical but also the NO<sub>3</sub> has a part in the therapeutic results. He does not believe it proven that the organic silver salts are better because they are not precipitated by albumin. Silver nitrate is also to be preferred because it is less expensive. The Janet method should be used, the patient being given small bottles containing 0.03 to 0.06 silver nitrate and 0.025 potassium permanganate. These the patient dissolves in ¼ liter of very hot water and injects as hot as can be borne (about 37° C.). Most patients can stand three such injections daily.

**The Pharyngeal Tonsil in the Adult.** L. G. KAEMPFER, New York *Medical Record*, July 11, 1914.

Kaempfer calls attention to the frequency with which adenoids persist into adult life, and that these cause many of the stubborn chronic conditions within the nose and have a profound effect upon the ears. Until the condition is recognized, many of these patients are treated, sometimes for years, for intranasal and pharyngeal catarrh, obviously with little benefit. Kaempfer reports six cases, the age of the patient ranging between 18 and 32 years. In all six patients, removal of the adenoids caused marked improvement, hypertrophied turbinates became smaller; intranasal congestion was relieved and discharges diminished or ceased. In one case, an old fetid ear discharge was profoundly improved.

[The reviewer can corroborate Kaempfer's statement. It is surprising how frequently routine examination reveals vegetations in the pharyngeal vault, which are frequently the underlying cause of "chronic catarrh" and progressive deafness.]

**New Technic for the Removal of Intrinsic Growths of the Larynx.** ROBERT CLYDE LYNCH. *The Laryngoscope*, July, 1914.

Lynch uses the suspension laryngoscope for the purpose of viewing the larynx. Many cases are done under local anesthesia. A suction apparatus is necessary. With suitable instruments the author has been able to work with such precision that he can take out a small tumor, reapplying the surface membrane by the application of tincture of benzoin. He has been able to stitch together the membrane of the larynx after excision of the tumor.

**The Preparation of Dry Bony Areas for Skin Grafting.** CHARLES H. MAYO, Rochester, Minn. *Annals of Surgery*, September, 1914.

Mayo here describes a method, which he has practiced successfully for many years, of shortening the period of healing of large bony surfaces laid bare by burns, infection, or the removal of malignant periosteal growths. He recommends that, by means of a drill, the entire bone area be perforated at intervals of a quarter of an inch apart and penetrating to the diploë of the skull or to the blood supply of the long bone, as the case may be. These perforations cause granulations to come to the surface and unite, with ample blood supply for skin-grafting. Until the protecting granulations appear the wound must receive excellent care to prevent infection. The cases which Mayo thus treated included large areas of the skull left after the excision of carcinoma, sarcoma, or infection with pneumococci.

**Correction of Permanent Contractures of the Fingers Secondary to Cellulitis of the Palm.** (*De la Correction des Flexions Permanentes des Doigts Consécutives aux Panaris et aux Phlegmons de la Paume de la Main.*) H. MORESTIN, Paris. *Revue de Chirurgie*, July 10, 1914.

These flexion contractures, occurring most often among the working classes, are the most unfortunate of the sequelæ of infections of the fingers and the palm. In the severe grades under consideration by the author the attempt is made at their reconstruction. Morestin's treatment consists, essentially, in the division of all obstacles opposing extension and the fixation of the finger in the corrected position. He makes two flaps of skin, one on each side of the longitudinal scar, and then proceeds to carefully and minutely excise all the scar tissue that opposes extension. Incision of the joint capsule may be necessary. Each flap of skin is then split up by angular incisions into tiny flaps that are imbricated to cover the defect. It is essential that joint surfaces are covered in, for the rest, areas of tissues not covered by skin, may be permitted to heal by granulation. The result is, in Morestin's hands, a finger in extension, one in which flexion to a slight degree (action of the interossei and lumbricales) is possible, and apposition to a considerable degree if the finger is the first or fifth. The patients operated upon by him were able to return to their occupations with considerable return of capacity for their work. Morestin scouts any attempt to reconstruct tendons in these cases.

**The Effect of the X-Rays Upon Bone Healing.** (*Ueber den Einfluss der Roentgenstrahlen auf die Bildung der Knochennarbe.*) K. SALVETTI, Camerino, Italy. *Deutsche Zeitschrift fuer Chirurgie*, Vol. 128, Parts I and II.

These interesting experiments were conducted upon rabbits in an attempt to learn whether the x-rays had any effect upon the healing of fractured bones. From a careful series of histological studies the author shows that Roentgenization of fractures is disadvantageous to the development of callus. Cartilage appears between the ends of the divided bone at too early a time, the bony tissue in the neighborhood of the fracture has less lime than in the control animals, and the Haversian systems are too scantily developed. Relatively small doses of x-rays applied daily were sufficient to give these results.

**The Treatment of Gas Phlegmons.** (*Zur Behandlung der Gasphlegmonen.*) W. GOLDSCHMIDT, Vienna. *Wiener Klinische Wochenschrift*, July 9, 1914.

It is well known that the treatment of gas phlegmon, i. e., wound infection, by the b. aerogenes capsulatus, is usually unsuccessful. Ten successes in eleven cases, observed during the Balkan war, have led Goldschmidt to the belief that his method of treatment will lift this opprobrium. His method consists in wide incision, no dressing except a light application of gauze to absorb discharge and frequent irrigations with peroxide of hydrogen. He believes that close bandaging is contraindicated, because the bacillus is an anaerobic one and therefore grows more readily when air is excluded from the wound.

**Coccygodynia—A New Method of Treatment by Injections of Alcohol.** F. C. YEOMANS, New York. *Medical Record*, August 22, 1914.

Yeomans reviews the general features of this malady and then submits a report of seven cases in which the injection of alcohol has effected a cure. Briefly, his method is the following: The needle of the syringe is inserted to the point of maximum tenderness over the coccyx; this is usually just below the tip of the bone, in the midline or slightly lateral to it. About 10 to 20 minims of 80 per cent alcohol are then injected. As a rule three to five injections suffice at intervals of five to ten days, and they are to be made at the most tender point. In none of the author's cases has recurrence taken place.



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## THE TECHNIC OF SPINAL ANESTHESIA.\*

BY W. WAYNE BABCOCK, M.D., F.A.C.S.,

Professor of Surgery in the Medical Department of  
Temple University; Surgeon to the  
Samaritan Hospital,

PHILADELPHIA.

The introduction of a local anesthetic within the dura is followed by a more or less complete arrest of conduction in those spinal nerve roots that come in contact with the solution. If the solution is sufficiently concentrated there is complete arrest of motor, sensory and sympathetic conduction of the segments affected. The effect upon the cord proper is relatively slight and it is often possible under high spinal anesthesia to demonstrate evidences of conduction along the paths of the cord. With weak anesthetic solutions sensory conduction may be arrested with but imperfect loss of motor or sympathetic conduction, while very weak solutions may cause only an imperfect analgesia. As would be expected, the loss of protopathic or pain sense involves a wider area and is more intense than the loss of epicritic or touch sense. Patients may, therefore, feel the knife, although it does not hurt them, or they may complain that alcohol burns the skin, although they do not recognize the incision of tissues. The duration of intradural anesthesia is influenced by the dosage and concentration of the drug employed and varies from twelve minutes to two hours. One to one and one-half hours is the average duration for the adult.

The most effective percentage strengths for intradural use we have found to be 4 per cent. for stovaine, 4 or 5 per cent. for tropacocaine, and 7 or 8 per cent. for novocaine. The weaker solutions give too light and transient an anesthesia and tend to become too widely diffused, while the stronger solutions are so concentrated as to diffuse imperfectly, limiting their area of action and at times increasing their danger. To secure efficiency when using a strong solution, the operator may be tempted to increase the dosage. For example, Jonnesco, who uses a 10 per cent. solution for lower spinal work, advocates nearly twice what we consider a normal dosage. Five or six centigrams of stovaine in 4 per cent solution will give an analgesia that lasts about ninety minutes; two or three centigrams of stovaine in 4 per cent. solution will produce an analgesia that lasts about fifteen or twenty minutes. It follows that in very young children, for whom only small doses may be given, prolonged operations are not conveniently done under spinal anesthesia.

Spinal anesthesia acts with great rapidity, the analgesia appearing within a few seconds after the injection and being rapidly followed by loss of motor power and muscular sense. With the average adult dose the analgesia reaches its intensity about fifteen minutes after the injection, and then gradually fades. First the motor loss and muscular sense gradually return, the sympathetic regains its tone, the area of epicritic loss becomes gradually reduced, and finally the area of protopathic arrest disappears. The effect is tide-like, the influence gradually spreading upward along the cord until the highest nerve roots in the effective range of diffusion of the drug are affected, and then the wave of analgesia recedes. This tide, which washes upwards and then returns, is not so clearly noticeable in a downward direction, although when a small dose of the analgesic has been injected near the upper part of the cord, there may be observed waves of analgesia passing simultaneously upward and downward, to reach their intensity and widest limits, and then gradually recede toward the segments close to the point of injection. As the analgesic wave diffuses upward the strength of the drug is weakened by the diluting cerebro-spinal fluid. For this reason the nerve roots near the apex of the wave are more lightly and transiently affected than the nerve roots first washed by the injection.

For prolonged and complete analgesia it is desirable, therefore, to make the injection if feasible into the dura through an interspace adjacent to the nerve roots that supply the field of operation. Thus for operations upon the perineum or anus the injection is especially effective if made through the third or fourth lumbar interspace; for operations upon the leg, through the second lumbar interspace; for the lower abdomen or groin, through the first lumbar interspace; while for operations upon the stomach, gall bladder or liver, the injection is most effective when given through the eleventh or twelfth dorsal interspace. With a minimum dose injected through the twelfth dorsal interspace, although the analgesia may be sufficient for upper abdominal work, it may be transient and patchy for operations upon the legs or perineum. It is obvious that the operator who injects the solution through the fourth lumbar interspace and then attempts to do a gastro-enterostomy, will condemn the anesthetic as ineffective and unreliable, as may also the operator who attempts an operation upon the toes after injecting a small quantity of the analgesic in the twelfth dorsal interspace.

The injection of weak solutions in the lower part

\*Read during the Second Meeting of the American Association of Anesthetists, at Atlantic City, June 22, 1914.

of the cerebro-spinal canal is relatively safe, for as they diffuse upward toward the phrenic nerve roots of the cervical region they are so weakened as to have little effect. Weak solutions injected in the middle or upper dorsal region or in the cervical region are, however, dangerous, as they interfere with the innervation of the muscles of respiration. Strong solutions of high specific gravity injected in the lower part of the arachnoid cavity may be dangerous by upward gravitation unless watchful care is taken not to elevate the pelvis until a sufficient time has elapsed to permit the absorption of the bulk of the drug. It should be evident, therefore, that for successful spinal anesthesia the operator should not only understand clearly the physiologic action, but should understand the dosage and the interspace most suited for the special operation to be performed. The operator should also realize the transient nature of spinal analgesia and should be prepared promptly to start the operation after the injection; otherwise valuable time may be lost and the patient may emerge from the influence before the operation has been completed. Although spinal anesthesia is relatively safe and very effective when used skilfully, it is an exceedingly dangerous and unreliable anesthetic in the hands of those who do not understand its action.

#### SOLUTIONS EMPLOYED.

My associates at the Samaritan Hospital and myself have now operated under spinal anesthesia over 6,000 times.

Personally, we prefer solutions in ampules, on account of their convenience, accuracy, known specific gravity and greater assurance of sterility. In any case the preparation should, as far as is possible, be of unquestioned reliability. Unfortunately this is not always assured, and we have found living micro-organisms in solutions upon the market.

One of the problems in spinal anesthesia has been to produce a sufficiently high effect for upper abdominal work. This may be accomplished, first, by selecting a high interspace for the injection; second, by withdrawing a considerable quantity, 5 to 15 c.c., of cerebro-spinal fluid, adding the drug and re-injecting or injecting a corresponding quantity of the analgesic in weak solution; third, by employing gravity to retain the solution in contact with the selected nerve roots. This latter method is based upon the fact that any solution introduced within the cavity of the arachnoid rises or falls according as its specific gravity is heavier or lighter than that of the cerebro-spinal fluids. By adding glucose, milk sugar or mannitol the specific gravity of the solution may be increased, and by giving the injection of such a heavy solution with the patient upon his side, his shoulders and hips elevated, and then cautiously rolling the patient on his back while still maintaining the elevation of the hips and pelvis, the heavy solution remains in the most dependent portion of the dural cavity, the lower dorsal region. This is the method elaborated by Barker. As it is frequently desirable to operate with the patient in the Trendelenburg posture, or to lower the head of the patient for circulatory depression, I have for several years chiefly used a solution lighter than that of the cerebro-spinal fluid.

Cerebro-spinal fluid has a specific gravity of about 1.0055. The addition of a 10 per cent. absolute alcohol to a 4 per cent. solution of stovain reduces its specific gravity to about 0.992. This light solution ascends in cerebro-spinal fluid with a speed somewhat approximating 10 centimeters per minute. Stovain has the property of alkaloids of being precipitated by alkalies, and therefore a minute quantity of lactic acid is added to the solution to retard precipitation by the alkaline cerebro-spinal fluid. In case it is desirable to elevate the head and shoulders of the patient during the operation, a solution made heavy by the addition of 5 per cent. of milk sugar is employed. The following are the formulas that we have found useful:

#### Light Solutions.

A. Stovain .....	0.68 gm.
Lactic Acid .....	0.04 c.c.
Absolute Alcohol .....	0.2 c.c.
Distilled Water .....	1.8 c.c.
B. Tropacocain .....	0.1 gm.
Absolute Alcohol .....	0.2 c.c.
Distilled Water .....	1.8 c.c.
C. Novocain .....	1.16 gm.
Absolute Alcohol .....	0.2 c.c.
Distilled Water .....	1.8 c.c.

#### Heavy Solution.

D. Stovain .....	0.68 gm.
Lactic Acid .....	0.4 c.c.
Milk Sugar .....	0.10 c.c.
Distilled Water to make.....	2 c.c.

The solutions are kept in sealed ampules each containing 2 c.c. of the solution. They should be prepared under aseptic precautions and sterilized by the intermittent method at a temperature about 65° C. Although manufacturers sometimes contend that these substances withstand the temperature of boiling water with impunity, we have found boiled solutions objectionable. The dose for the adult of each solution is from one to one and one-half c.c. Novocain is the weakest of the anesthetics, is not precipitated by the cerebro-spinal fluid, and does not hemolyse blood. It does not produce as satisfactory a loss of epicritic sense and motor power as solution A, which at the present time we prefer.

Solutions extemporized from powders or tablets I have abandoned from fear of bacterial contamination.

#### SELECTION OF THE PATIENT.

We have employed spinal anesthesia in patients of all ages, from the new born to those of advanced life. It may frequently be employed where ether is inadmissible or has produced dangerous symptoms. Probably no anesthetic gives as great a degree of muscular relaxation with as little danger as spinal anesthesia. As a rule, patients who have a marked hypotension of the circulatory system, or those in whom a marked reduction of vasomotor pressure would be dangerous, should not have spinal anesthesia. Should it be administered to such a person a cannula should be tied in a vein of the arm connected with a funnel of salt solution before the intradural injection, and any dangerous fall of blood pressure counteracted by the cautious intravenous introduction of the salt solution containing adrenalin. By this expedient, I was enabled to successfully carry a patient, at the beginning pulseless and apparently moribund from a ruptured uterus, through a Porro operation. A patient pulseless or nearly pulseless from traumatic shock should not, as a rule, be given spinal anesthesia until reaction has occurred. Patients with advanced peritonitis, with great abdominal distension and cyanotic extremities, are not good subjects for spinal anesthesia; especially is this true of the middle-aged obese patient. Patients in collapse from traumatic ileus do not well withstand the hypotension of spinal anesthesia. Patients with advanced septic disease of the biliary system and associated marked myocardial weakness are also bad subjects. The method is contraindicated in patients greatly depressed and toxic or with mechanical limitation of respiratory space, as from large pleural effusions or pus or serum, or massive intrathoracic growths. In patients in collapse from hemorrhage, the intradural injection should be made with great caution. Obese patients with short, thick chests and limited breathing apparatus are less favorable than patients with large respiratory mechanisms. Those very depressed patients who may be carried through an operation by local anesthesia or a few whiffs of ether should not be given the intradural injection. Patients with large fibroid tumors and myocardial degeneration should be given the injection with great caution. The aged and debilitated should be given relatively small doses. Young or middle aged adults of the robust type, patients with the hypertension of renal disease or eclampsia are good subjects for the injection. Children withstand rel-

atively large doses. Thus  $1\frac{1}{2}$  ctgm. of stovain may be given to the new born; 3 ctgm. to a child of five; 4 ctgm. to a child of ten. The proportionate size and robustness of the child are more important than the exact age.

#### PRELIMINARY NARCOTISM.

The retention of consciousness within the operating room is often objectionable, and in many instances this may be obviated by the preliminary injection of narcotics. We have employed morphine and scopolamine chiefly. For a robust adult  $\frac{1}{6}$  of a grain of morphine sulphate with  $\frac{1}{100}$  of a grain of scopolamine or hyoscin hydrobromide is given by hypodermatic injection about seventy-five minutes before the time of operation. If in twenty minutes the patient answers questions without evidence of mental confusion the injection is repeated; while for certain very robust and resistant patients a third injection of morphine either alone or combined with a  $\frac{1}{15}$  of a grain of apomorphine if the delirifacient action of the scopolamine predominates, or of both morphine and scopolamine if the previous injections have produced little effect, is given. These injections should be given at intervals of about twenty minutes and should be used with great caution or avoided in the debilitated, toxic or aged patient. In patients under thirty the delirifacient action of hyoscin or scopolamine often predominates and is objectionable. In these patients the initial dose of morphine may be  $\frac{1}{4}$  grain in combination with  $\frac{1}{50}$  of a grain of atropine. In children narcotics are rarely required. After the intradural injection, if properly reassured the child usually quickly adjusts himself to the environment of the operating room, and when convinced that the numbness and loss of power of the legs are quite proper, the little patient often will fall asleep during the operation. Narcotics intensify and by reducing epicritic sense increase the duration of spinal analgesia. When properly used they enable the patient to pass through the operation oblivious of the fact that he has been removed from his bed, and often strongly protesting on awakening that he has not been operated upon or even been asleep.

While narcotics render the patient oblivious of the operation, they increase the danger of spinal anesthesia or of any other anesthetic that may be administered, as they depress the centers of the central nervous system, suppress certain metabolic processes and produce undesirable, although often transient, alterations in the parenchymatous organs. In the asthenic, shocked, debilitated or aged patient they should be used with the greatest care or

avoided. Preceding or during spinal anesthesia consciousness may also be dulled by the administration of ether or other anesthetic by inhalation.

#### ASSOCIATED LOCAL ANESTHESIA.

Local anesthesia is at times of value in association with spinal anesthesia to extend the incision above the level of the analgesia or to prolong the intradural effect which may partly pass off before the operation has been completed. Likewise, in very extensive amputations, it is desirable to employ Crile's method of nerve blocking in association with the spinal analgesia.

#### AFTER TREATMENT.

Immediately after the operation patients who have received narcotic injections usually are given a large enema. Two quarts of warm water to which may be added 2 ounces of glucose and 3 drachms of sodium bicarbonate are slowly run into the bowel, and each fourth hour thereafter for the first twenty-four or forty-eight hours the patient receives from 4 to 8 ounces of fluid by rectum. If the narcosis is too prolonged or intense, there is incorporated into the first enema a pint of black coffee and 2 drachms of tincture of capsicum. The deeply narcotised patient must constantly be watched until awake and if there is any evidence of cyanosis or of obstruction in the upper air passages, the tongue and lower jaw must be held forward in such a manner as to give a free air way. In several instances death from suffocation has resulted from failure to observe this rule in patients comatose from scopolamine morphine.

#### METHOD OF INJECTION.

Before being brought to the operating room the back of the patient is scrubbed with acetone and painted with a 2½ per cent. tincture of iodine. A dry sterile binder is then applied. In the operating room the patient is seated across the operating table so that he sits well back from the edge of the table. The dressing is then removed and the back either flushed with alcohol or given a second coat of one-half strength tincture of iodine. The assistant observes that the patient sits squarely across the table, that the hips are even, that the elbows are parallel and at the sides of the patient, and that the forearms are crossed in front of the patient's body. Facing the patient he then stands on a low stool, holds the patient's hands with his right hand, while his left arm encircles the back of the patient's neck and his fist makes pressure against the patient's abdomen. The patient's chin is thus forced down upon his chest, the back is arched, but the patient should not be permitted to lean forward. The desired spinal interspace is now selected.

#### POINT OF INJECTION.

The point of injection for an abdominal operation should be approximately on a plane with the operative area. Thus for operations upon the stomach, liver or gall bladder, injections through the twelfth dorsal interspace give the best analgesia. For operations upon the lower half of the abdominal cavity, the first lumbar interspace; for operations upon the leg, the second or third lumbar interspace; for operations upon the perineum, the fourth lumbar interspace may be selected. Practically most of our operations have been done by injections through the first or second lumbar interspace with an occasional twelfth dorsal injection when it was desired to thoroughly anesthetize the upper abdomen. As a rule, the lower point of injection is safer, as the involvement of the upper dorsal nerve roots interferes with the respiration and increases the fall of blood pressure.

#### APPARATUS.

A syringe of 2 c.c. capacity of the Luer type is preferred. If properly made, the piston of such a syringe fits loosely enough to be forced out by the pressure of the intradural fluid. This is important as showing that the needle has properly entered the arachnoid. The Record syringe is rather heavy, and the piston does not move with sufficient ease. To insure delicacy of manipulation the needle should likewise be small and light. It should be of iridized platinum or gold to avoid breakage; have a length of about 7 centimeters and a diameter of 1/10 centimeter. A well fitted stylet should be provided so that the needle cannot become clogged in the introduction. The syringe, needle and stylet should be wrapped in gauze and boiled just before using, in water free from alkali, for fifteen minutes. The apparatus should be brought to the operator while still boiling hot not only to insure sterility, but also to serve to warm the anesthetic solution. The assistant now wipes the surface of an ampule with a bit of gauze moistened with alcohol and breaks the ampule at its neck. The contents of the ampule are drawn into the syringe, and air bubbles and excess of solution expelled. For an adult, the syringe usually should now contain from 1.2 to 1.5 c.c. of the solution. The needle containing the stylet should be entered close to the midline at right angles to the body and about the middle of the interspace. It should be carried directly forward until it is felt to be grasped by the dense interspinous ligament. Only in the dorsal region it is necessary to tilt the needle somewhat upward. In the lumbar region the greatest success is obtained by entering the needle at right angles

to the surface of the body. Following this rule I have failed to enter the spinal cavity only once in over 4,000 personal cases, the failure being in the case of a kyphotic dwarf. If the patient shows a scoliosis do not enter the needle in the midline of the body, but along the midline of the spinous processes, and pass the needle directly forward instead of attempting to deviate it to the midline of the back. The grasp of the needle by the cartilaginous interspinous ligament usually indicates that the needle is passing in the proper direction. After penetrating the ligament the stylet is withdrawn and the needle pushed forward a few millimeters at a time. The hand notes the cessation of resistance as the needle passes through the interspinous ligament and enters the loose areolar space external to the dura, and finally the slight resistance succeeded by a snap, as if a drum head had been punctured, when the needle penetrates the dura. If the needle being rather dull does not immediately puncture the dura, it is given a partial rotation so that its edge may cut through the dura. As soon as the dura is entered, cerebro-spinal fluid should begin to drop from the needle. If it does not do so, the needle is cautiously rotated and slightly moved until there is a free flow of fluid. At times it is necessary to reintroduce the stylet, make a very cautious aspiration with the syringe or to seek another interspace. If there is much difficulty with the first attempt, it is usually best to try another interspace. At times, if the needle enters directly in the median line, the plexus of veins external to the dura will be punctured and a few drops of blood may flow from the needle. We have observed no evidence of harm from this injury, and the flow of blood is usually quickly succeeded by clear cerebro-spinal fluid. With the cerebro-spinal fluid running freely, *and only when it is running freely*, the charged syringe is affixed to the needle. The piston is first withdrawn a short distance to permit the cerebro-spinal fluid to enter and mix with the solution, as well as to again prove the proper introduction of the needle. If a thorough diffusion is desired a part of the solution is now injected, more cerebro-spinal fluid is withdrawn by the syringe, and this procedure repeated two or three times until the syringe is empty. The needle is now quickly withdrawn, and if a light solution has been used, the patient immediately laid upon the table, which is so tilted that the shoulders are 2 inches below the level of the hips. This is to prevent an undesirable upward diffusion of the drug. Not over twenty seconds should be consumed in the injection.

The pulse and respiration are now continuously

watched, the latter by the movements of a wisp of cotton affixed to the end of the nose. If the patient is awake, diverting conversation is often desirable, and if not contraindicated by the operation small bits of ice or sips of water may be administered. If the patient is very weak an injection of 4 grains of caffeine and 1/15 of a grain of strychnine sulphate is given subcutaneously to anticipate any respiratory depression. A nearly pulseless patient should also have a needle, connected with a funnel containing physiologic salt solution, tied into a convenient vein. The salt solution is permitted to run into the vein from time to time as may seem to be indicated, and to each 6-ounce funnelful is added from 1 to 10 drops of adrenalin. The adrenalin must be used with caution and we do not add it unless the patient becomes pulseless at the wrist. The flow of adrenalin is also to be cut off by pinching the tube as soon as the pulse returns, for fear of an excessive action upon the heart. For weak patients, not sufficiently asthenic to require the intravenous use of adrenalized salt solution, the subcutaneous injection of one ampule of pituitrin at the onset of the operation may be of value. For nervous faintness, the inhalation of aromatic spirits of ammonia or a few drops of ether may be tried.

Should the patient show evidence of nausea, the head and shoulders are lowered to a greater degree by inclining the table. Should respirations become shallow or imperfect then artificial respiration by compression of the thorax must be resorted to. It should be continued if necessary for one hour or more, or until the patient is able to resume spontaneous respiration. If the patient be so obese or the intrathoracic condition so interferes as to prevent artificial respiration by compression of the thorax, then forced artificial respiration should be tried. In such an emergency we doubt the value of the Meltzer intra-tracheal method. The pulmotor, if quickly available, may be used. In a sudden emergency we can certify to the value of a full size tracheal tube and the direct rhythmic inflation of the lungs by the surgeon or assistant. Using a piece of drainage tube that is cut off square at the end, pressed over the opening of the tracheal tube, the surgeon inhales deeply and inflates the patient's chest by blowing through the rubber tube. Exhalation occurs when the tube is lifted from the external plate of the tracheal tube. The pressure of the inflation cannot be harmful for an adult, as it cannot exceed or indeed reach the pressure within the surgeon's chest. While this method involves



the dangers of a tracheotomy wound it may be quickly carried out with but few instruments.

#### AFTER TREATMENT.

No special after treatment is required. In over 6,000 punctures without an occlusive dressing none have shown any signs of infection, so that we consider the sealing or dressing of the point of puncture unnecessary. The head and shoulders should not be elevated until one hour has elapsed from the time of injecting a light solution. Secondary headaches should not occur, and when of the characteristic spinal type, that is when they are increased by raising the head from the pillow, are associated with some stiffness of the posterior muscles of the neck, they indicate the use of contaminated or decomposed solutions. Such solutions may not only cause intense headache, but also abducens palsy, and should be promptly discarded. We do not believe that abducens palsy follows the employment of pure solutions. The anesthetic does not contraindicate the prompt administration of water either during or after the operation, and such food is given as in the particular case seems best without regard to the fact that the patient has been anesthetized. Secondary nausea or vomiting should not occur as a result of spinal anesthesia, and the patient should have less post-operative pain, less headache, less backache and general discomfort than the patient who has received ether. Finally, it is to be emphasized that the novice should not attempt spinal anesthesia without carefully investigating the subject, and should only use the method upon robust patients until he acquires dexterity and familiarity with the technic.

2033 WALNUT STREET.

### SOME CONSIDERATIONS ON THE NATURE OF SURGICAL SHOCK.\*

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Before proceeding to a consideration of the nature of surgical shock, it will be well to point out some of the ambiguities and general obscurities of the word shock. I have been working with a very special kind of shock—the kind that comes when the spinal cord is completely cut across, or frozen, or deprived of its blood supply at a given level. The cutting or the freezing or the lack of blood completely blocks the conduction of nerve impulses past the frozen or cut or injured point. The same result may be accomplished through the growth of a sarcoma of the vertebral column.<sup>1</sup> There is a

very definitely localized lesion, and the results are also definite.

If the complete transverse lesion of the cord occurs in the mid-dorsal region, we find a complete and permanent paralysis of all the skeletal muscles whose motor nerves arise below the level of the transection, together with a complete and permanent loss of sensation in all regions the sensory nerves from which enter the spinal cord below the level of the lesion. The blood pressure may be very low, or may closely approach the normal measurements, depending on whether the lesion is high up, at the level of the sixth or seventh cervical segment, or much lower down. The visceral symptoms are severe at first, but improve as time goes on.<sup>2</sup>

This kind of shock is called spinal shock, but it is a kind of shock with which you, as anesthetists, have very little to do. The kinds of shock with which you deal do not generally involve any destruction of tissues within the central nervous system. It follows from this that there are at least two different kinds of shock—the spinal shock and some other kind. Personally, I believe that there is more than one other kind.

One of the first investigators to recognize clearly this difference and to insist upon a distinction between the two kinds of shock was Professor W. T. Porter,<sup>3</sup> and many of the other clear conceptions of processes involved together with the accurate descriptions of conditions found, so far as they deal with the physical aspects of surgical shock, have come from Professor Porter and his pupils. Concerning the chemical phenomena in shock, important though they are, we will have but little to say at this time.

Let me show what I mean by the statement that there is more than one other kind of shock. A patient may have suffered from a severe crushing injury of a limb, but not have suffered any injury to the central nervous system directly, and he may not have suffered much hemorrhage. Yet there is a fall of blood pressure, a rapid pulse, and all the other features of the clinical picture of shock. This is certainly not the kind of shock with which I have been working, since all the ordinary reflexes of the skeletal muscles, or most of them, may be obtained from the various parts of the body. There is no complete blocking of conduction involving the whole area of cross section of any part of the spinal cord.

Again, in some of the specific infectious disease, the patient may suffer collapse toward the close of

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the disease. No mechanical injury has occurred, yet the picture is that of shock.

We should, then, be careful to tell the circumstances under which shock has arisen. To speak of a particular case as traumatic shock is not sufficiently definite, unless we specify whether or not the central nervous system has been injured directly. If the central nervous system has been injured, we may have the exact homologue of the laboratory condition known as spinal shock. Not all injuries to the central nervous system result in a complete blocking of all the paths below a certain region, so that the description is not sufficiently exact unless the nature and extent of the injury is specified. The man with a crushed leg may die from shock, and the teamster who has had his spinal cord crushed beneath a load of coal may recover, although certain of the manifestations of shock may be more severe in the teamster with the crushed spinal cord.

To the laboratory worker, certain clinical descriptive terms, such as traumatic shock, do not, therefore, convey any very definite idea either of the nature of the injury or of the condition of the patient. I shall not, therefore, attempt, in this paper, to follow the ordinary clinical terminology, and I trust you will pardon me if I speak of conditions rather than names.

Since in practically all cases of acute shock, low blood pressure is one of the physical signs, we may first look into the mechanism for maintaining blood pressure under normal conditions, using this as a type of reflex nervous mechanisms, and then point out some departures from the normal as they occur in shock.

The heart and blood vessels, both of which are under the control of the nervous system, are the principal agents in maintaining blood pressure under ordinary conditions. The vasomotor nerves vary the caliber of the arteries and arterioles, and the mean blood pressures tends to rise or to fall according to whether the vessels constrict or dilate. When the blood pressure tends to fall because of the dilation of the blood vessels, the heart beats faster, because of accelerator impulses sent out from the central system over the sympathetic nerve supply, and forces more blood through the vessels. When the vessels are constricted, the heart beats more slowly, in response to impulses passing out of it over the vagus. The rapid heart rate of a man who has just finished running is familiar to all of you. But the heart will not beat faster when the blood pressure falls, nor become slower when the blood pressure rises unless the sympathetic and

the vagus nerves are uninjured and active. When these nerves are rendered inactive by cutting them across, the rate of the heart is unchanged when the blood pressure rises or falls.<sup>4</sup> Rabbits can no longer run distances after these cardiac nerves are cut, although there may be no lesion of the heart or of the blood vessels. The thing to remember is that the heart while in the animal body under constant physico-chemical conditions will not change its rate unless acted upon by nerve impulses coming from outside the heart. I insist upon this point at this time because of a slight misconception that may have arisen in the past.<sup>5</sup> Only after its excision from the body will changes in pressure alone bring about changes in the heart rate, and the rate then increases with the pressure.

It is my belief that there are at least four mechanisms involved in the maintenance of blood pressure, namely, (1) the vasomotor nerves, whose common point or origin lies in the medulla oblongata; (2) the heart and its nerves—intrinsic, perhaps, as well as extrinsic; (3) the skeletal muscles; and (4) some property of the tissues of the vessel walls, possibly independent of the nervous system, in addition to those properties directly under nervous control.

These mechanisms for maintaining blood pressure are, however, dependent for the most part upon the central nervous system for their efficient and coördinated action. And, as Descartes long ago suggested with reference to coördination in general, the central nervous system here serves as the mechanism of coördination between the afferent impulses and the motor response. We must consider, then, the various structural or functional elements interposed between the starting point of the afferent impulses and the muscle or gland cell in which the response occurs.

At the outset of the discussion of the nervous mechanisms involved in the process of coördination, we may point out that there are two systems concerned: (1) the somatic system, sensory and motor, and (2) the visceral system, sensory and motor.

The somatic sensory nerves arise in the organs of general and special sensation, the eye, the ear, the skin, muscles, tendons, and joints. They convey information of the general happenings in the somatic or "body" part of the organism. Most of these impulses at some time or another arise into consciousness, although some of them undoubtedly pass directly through the lower levels of the nervous system without entering into the cerebrum.<sup>6</sup>

The somatic motor system is concerned with the movements of the skeletal or striated muscle.

The visceral sensory nerves arise in glandular structures and in smooth muscles throughout the visceral system. Some of them convey impulses which may enter into consciousness, but others do not. They constitute the afferent portion of the sympathetic or autonomic system.

By the autonomic system, Langley means not only all the sympathetic system but also certain fibers in some of the cranial nerves, such as the vagus, and sacral fibers in the *nervi erigentes*. It includes both afferent and efferent fibers.

The visceral motor nerves, as their name implies, convey afferent impulses from the central nervous system to the various structures comprised in the viscera—the heart and the blood vessels, the gastrointestinal tract, all the glands and other similar structures containing smooth muscle fibers. They belong to the efferent portion of the autonomic or sympathetic nervous system.

In the operation of any mechanism which involves the coördination of afferent and efferent impulses, there is first of all a receptor or nerve ending at the periphery which is sensitive to stimuli. This receptor may be a free ending of the nerve in the tissue or it may be a specialized ending which is particularly sensitive to one particular form of stimulus, such as light, or touch. Sherrington has defined a sense organ as a mechanism for lowering the threshold value of the stimulus. As a rule, the nerve endings are more sensitive to stimuli than the nerve trunks. There are (a) afferent nerves leading from the receptor to the central system; (b) the junction or synapse—perhaps many synapses in series, in the central nervous system itself between the terminations of the afferent neurone and the final efferent neurone; (c) the efferent fiber; (d) the terminations or end plates of the efferent fiber; and (e) the effectors—muscles, gland cells, or whatever else they may be. All of these things enter into the formation of a reflex arc in a higher animal. And as each of them has certain peculiar properties of its own, as evidenced by its reactions to drugs, or to other changes of conditions, we may consider each one separately.

The receptors and the afferent nerves may be anesthetized either partially or wholly, by cold, pressure, cocaine, and similar agents; or some of them may become unusually sensitive through inflammatory processes.

The synapses are affected by strychnine and other drugs, and by changes in the oxygen and carbon-dioxide content of the blood. The synapses also have the faculty of summation in a high degree (Stirling). A single stimulus applied to an afferent

nerve may produce no effect, but if repeated sufficiently often, and for a sufficient time, the nerve impulse set up may become sufficiently intense to pass the synapse and produce an effect. The synapses are the most sensitive portion of the arc to the effects of prolonged lack of oxygen, as is shown by resuscitation experiments.<sup>7</sup>

Strychnine, up to a certain limit, increases the passability, or decreases the resistance, at the synapse. But even in small doses, it may increase the resistance or even block conduction for vasomotor impulses. This paralysis of the vasomotors may occur at a time when the passability of the synapses for reflexes of the skeletal muscles is but little increased,<sup>8</sup> and the paralysis of a previously injured region of the spinal cord, e.g., during or after recovery from anemia, for responses of the skeletal muscles as well as vasomotors, occurs at a time when the reflex response of the skeletal muscles through uninjured portions of the cord is still increased. The paralytic action of strychnine is manifested earlier after previous lack of oxygen than otherwise.<sup>9</sup>

The efferent nerve cells are excited by an increased concentration of carbon dioxide in the blood and asphyxial convulsions may result. The cells constituting the respiratory center in the medulla oblongata are particularly sensitive to slight changes of oxygen and carbon dioxide tension in the blood. It is the changes in the concentration of the hydrogen ions associated with these slight increases in carbon dioxide or decrease in oxygen which constitute the effectual stimulus for respiratory movements.<sup>10</sup>

The relation of the efferent nerves to the effectors, i.e., the muscle or gland cells, is not altogether a simple one. There is good reason for believing that there is a third element intervening between nerve fiber and the muscle or gland cell—the receptor substance of Langley. The three elements—the end of the nerve fiber, the receptor substance, and the muscle or gland cell—constitute what Elliott has called the myo-neural junction, and, according to Elliott,<sup>11</sup> it is upon this myo-neural junction between sympathetic nerve fibers and smooth muscle that adrenalin acts. Adrenalin does not act upon smooth muscle directly, since smooth muscle which is not innervated from the sympathetic system does not respond to its application. But smooth muscle which is innervated by the sympathetic system will respond to the application of adrenalin even after the nerves going to it have been divided and have degenerated.

The myo-neural junction between somatic nerve

and striated muscle is markedly affected by such drugs as curare, by certain toxins whose origin apparently is in the gastro-intestinal tract, by the waste products of metabolism, fatigue products, and other substances of like nature.

The synapses, particularly of certain regions of the central system, and the myo-neural junctions are the weak places in the reflex arc, and the places most commonly acted upon by foreign substances, toxins, or other adverse influences. The nerve fibers are, in general, more resistant than the nerve cells.<sup>12</sup> The Betz cells of the cerebral motor cortex may be inexcitable during ether narcosis, but the fibers of the pyramidal tract in the spinal cord may still be highly excitable. Nor are the synapses between the fibers of the pyramidal tract and the cells in the spinal cord about which they end affected to the same extent as the synapses in other regions, such as the cerebrum.

Afferent impulses over the visceral sensory nerves are not limited in their effects to reflex responses through the visceral motor system. Irritation within the stomach may lead to vomiting, and as will be shown a little later, vomiting involves the action of certain striated muscles. Similarly, afferent impulses over the somatic sensory nerves may bring about a reflex response which will involve the visceral motor system as well as the somatic. The mere sight of a disagreeable object may produce vomiting.

This community of relationship between somatic sensory, somatic motor, visceral sensory, and visceral motor systems is an important one. Various kinds of afferent impulses may lead to the same general motor response. The various kinds of afferent impulses which may lead to vomiting illustrate this point. But no matter over what channels the different afferent impulses which lead to a particular motor reaction may pass, they eventually come to a definite group of cells somewhere in the central system, in which the motor or efferent impulses arise. From this point on, the path is the same, no matter what the nature of the afferent impulse may be. We have, therefore, the principle of the final common path (Sherrington) founded on facts of the general character which are here briefly indicated.

In addition to the reflex elements involved in the maintenance of blood pressure, there is evidence of the existence of an automatic elements, i.e., an element dependent upon the changes of blood pressure or blood constituents within the vasomotor center in the medulla oblongata.<sup>13</sup> This is analogous, though not so preponderant in its action, to

the well-known automatic element in the respiratory mechanism, dependent upon the "blood-stimulus" for its normal operation. Evidence of such a sensitiveness to the "blood-stimulus" in the motor cells of the spinal cord has been recently adduced by Graham Brown.<sup>14</sup>

Such, then, is the nervous, muscular, and glandular mechanism involved in the circulation, and such are its strong and its weak points. Which of these are affected in shock, and how?

It requires but little reflection to see that the sympathetic—the viscerosensory and visceromotor system is the one primarily and most markedly affected in surgical shock. The patient may be fully conscious, and have voluntary control of the movements of the skeletal muscles. It is true that the movements may be sluggish, and that the skeletal muscles may be more flaccid than usual, but it is a question whether this may not be a secondary result of the low blood pressure and other disturbed metabolic conditions of the body as a whole, rather than a primary effect.

Nor would complete relaxation of the skeletal muscles, such as occurs after intravenous injection of curare, account for the great fall of blood pressure observed. The vascular system and the heart must then be responsible. It is commonly observed that the heart beats rapidly in such conditions. The heart itself, independently of its extrinsic nerves, never beats more rapidly when the blood pressure is low. The heart must, therefore, be receiving accelerator impulses over the sympathetic nerves during certain phases of shock.

The reflex mechanism for acceleration of the heart is not exhausted nor depressed, but, on the contrary, is more active than usual.

It has been shown also that many of the peripheral arteries are constricted and not dilated.<sup>15</sup> So far as these vessels go, there is again no exhaustion of the reflex or other mechanism for vasoconstriction, but even an increased activity. The question arises whether all the arteries in the body are similarly constricted, or whether some of them may be widely dilated. It is known, for example, that the peripheral blood vessels, and particularly the arterioles, constrict when the surface of the body is cooled, but the systemic blood pressure does not necessarily arise. Nor does the increased flow of blood to the surface when the external temperature is high necessarily entail a fall of pressure. There is either a compensatory change in the caliber of the deep blood vessels or a change in the heart rate, or both, by which the blood pressure is maintained at a nearly constant level. Porter,<sup>16</sup> how-

ever, has found that stimulation of an afferent nerve apparently affects all parts of the vasomotor system in much the same way, causing constriction of the splanchnic and peripheral vessels alike, or else dilation of all of them. Stewart's<sup>17</sup> studies on blood flow in disease are leading to the acquisition of data on this point, and clearly indicate that in certain disease processes at least, there is a difference in the distribution of the blood to various parts of the body, probably due to local changes in the caliber of the arteries.

It is known also that active muscles and glands receive more blood than when in the resting state. For the present, I believe that the assumption that all the arteries are constricted in surgical shock must remain purely an assumption until further evidence is adduced, either for or against it.

But if all the arteries are constricted, and the heart is beating rapidly, indicating no exhaustion of these mechanisms, some other part of the vasomotor system must be at fault. It has been suggested that the veins, particularly in the splanchnic region, are dilated and that the blood is in them. One fact seems to militate against these two suppositions, i.e., that all the arteries are constricted, and that the blood is largely accumulated in the veins; it has been found that stimulation of an afferent nerve will produce a rise of blood pressure when the animal is in a condition of surgical shock.<sup>18</sup> Such a rise of blood pressure usually comes about through constriction of the arteries rather than through constriction of the veins, and it would appear that there were some arteries at least which were still capable of further constriction. Such a view would necessitate the assumption that all parts of the arterial system were not affected alike by the vaso-constrictor nerves during shock, but that some arteries, possibly those in the splanchnic region, were somewhat dilated.

Whatever the immediate cause of the low blood pressures may be, it may well become part of a vicious circle. Even though the blood be well oxygenated by artificial respiration, and the heart be beating regularly, a previously damaged portion of the central nervous system, e.g., the brain, after subjection to anemia, does not recover as long as the systemic blood pressure remains low.<sup>19</sup> Nor does this fact need surprise us, when we remember that, among the other relatively constant conditions of the mammalian body, a blood pressure varying but a few millimeters under the various conditions of activity from day to day or year to year, is an important item. Any considerable variation from this usual level is strong presumptive evidence of

abnormal processes involving other mechanisms than that for circulation.

If the law of mass action holds for the reactions of the animal organism, we would expect any very wide departures of any one condition—blood pressure, oxygen or carbon dioxide content of the blood, or whatever it may be—from the usual standard to bring about associated changes in the other conditions coexisting with it.

With regard to the causes of shock, we may consider briefly a few of the current theories or hypotheses.

Crile has assumed as the basis for his explanations a stimulation of the nociceptors by the operative procedures. He emphasizes the fact that the afferent nerves are still excitable, and that they are transmitting impulses to the central mechanisms. It is true that in surgical anesthesia with ether, the efferent or motor nerves are still excitable, and probably the afferent nerves are also excitable. But it is a familiar fact, known to every one who has done even the routine mammalian experiments of the student laboratory, that no reflexes of the skeletal muscles can be obtained by stimulation of afferent nerves in an anesthetized dog. But the vasomotor responses, the effects on the heart beat and upon the respiratory movements can still be obtained in response to stimulation of afferent nerves when the animal is in surgical anesthesia. Furthermore, these effects on the smooth muscles and upon the respiratory movements may be obtained in a decerebrated dog or cat. In other words, the only reflexes which can be obtained in anesthetized animals may be obtained equally well in decerebrated animals, and there is no particular reason to suppose that the only reflex path open in anesthesia involves any part of the cerebrum. They are all visceral reflexes through the lower levels of the encephalon.

Dr. Crile, however, says that he finds chromatolysis in the nerve cells occurring in the cerebrum, and attributes this to the effect of afferent impulses. When we consider that, in addition to the fact that no reflexes involving the skeletal muscles, and hence none that could involve the cells of the cerebrum in any way, can be obtained in anesthetized animals, the cerebral cortex is itself inexcitable in such animals, one wonders just how much damage these afferent impulses are doing to the cells of the cerebrum. And, furthermore, while it would not perhaps be so surprising to see some chromatolysis in the general sensory area of the left cerebral cortex after amputation of the right leg, it is passing strange that we find chromatolysis in the visual and

auditory cortical areas of the other hemisphere of the cerebrum.

Similar considerations apply to the cerebellum. There is inexcitability of the cortex, and a complete absence of all the usual reflex phenomena attributable to the cerebellum, such as tone of the extensor muscles of the limbs. Yet, chromatolysis occurs here also.

It is one of the well-established facts of neurology that afferent fibers from a given region of the body terminate in definite regions of the cerebral cortex. And it is likewise a fact that the cells of origin of the motor fibers to the muscles of any given region of the body lie in a definite area of the cerebral cortex. There is a definite localization of the projection fibers, afferent and efferent, in the cerebrum. We should accordingly expect to find chromatolysis in those regions of the cerebral cortex in which the afferent fibers from the injured part end, or in which the cells of origin of the motor nerves to its muscles and glands lie. Such, however, is not the case. Dr. Crile admits that there is no specificity of chromatolysis, but that it occurs in all regions of the cerebrum and in the cerebellum.

It has been shown also that chromatolysis occurs in animals which are not in the condition of surgical shock, but which manifest rather different physical signs.<sup>20</sup>

Finally, Nissl himself pointed out some years ago that chromatolysis was not a lesion indicative of any specific injurious influence, but that it might arise in response to many injurious agencies.

To sum up the situation with reference to the rôle of the cerebrum in, and the relation of chromatolysis to, the cause of shock, the various lines of evidence adduced: (1) that, when an animal is in a condition of surgical anesthesia, no afferent impulses which are normally operative are producing any noticeable reflex response on the skeletal muscles; (2) that, in general the cortical cells are inexcitable to electrical stimuli at such a period; (3) the fact that chromatolysis occurs not only in the particular regions of the brain in which they might be expected to occur on any known basis of localization, but also in other widely removed and scattered regions of the brain; (4) that animals may show a considerable degree of chromatolysis and not manifest any of the physical signs of surgical shock as they are ordinarily understood; and (5) that chromatolysis may occur in response to the action of many diverse injurious agents, such as the anesthetic itself, force one to conclude that the relation of chromatolysis to the onset of shock cannot be very important or very definite.

An animal may be completely decerebrated without showing any particular signs of surgical shock, although the spinal shock may be profound. After a time the reflexes of the skeletal muscles return and the symptoms of spinal shock gradually abate in severity. But it is now possible so to treat the animal as to induce the condition known as surgical shock. The blood pressure falls, the pulse becomes rapid and feeble, and the respiration shallow, or even periodic. Surgical shock may be induced in the absence of the cerebrum, and whatever afferent impulses may be involved in its onset certainly do not pass through the cerebrum. Nor are efferent impulses from the cerebrum demonstrable here.

These facts acquire a peculiar significance with reference to the onset of shock when considered in the light of the relation of the medulla oblongata to the visceral system. It is in the medulla oblongata that we find the first extensive connection between the nerves bearing afferent impulses which are capable of affecting the viscera and the efferent visceromotor fibers.<sup>21</sup>

In addition to the rapid heart rate and the constriction of the arteries already mentioned, there are certain other effects due to the sympathetic or autonomic system that are worthy of some attention. Space does not permit their consideration at this time. Nor can the discussion of the sources of the afferent impulses be taken up in detail. Both of these questions must be left for future discussion.

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PROPHYLAXIS OF POST-ANESTHETIC  
VOMITING.\*BY H. WARREN BUCKLER, M.D.,  
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I am going to ask the indulgence of this society in calling its attention to some very old, very well-known facts which I believe to be of practical value to the individual about to undergo a surgical operation involving the administration of a general anesthetic.

It should be the aim and object of all of us engaged in the practical administration of anesthetics to adopt every means known towards eliminating or minimizing the disagreeable complications and sequelae that are likely to occur. There is no doubt that of these vomiting is the most distressing and its prevention or reduction will do much towards lessening the horrors of taking a general anesthetic.

Doubtless we all have our own views as to the etiology of vomiting. Many believe it to be influenced largely by the kind of anesthetic used, others by the method of administration. Some think the temperament, the individual idiosyncrasies, physical condition of the patient or gentleness of the surgeon to be important factors in the anesthetic recovery. Some regard vomiting as a distinctly local condition, a gastritis due to the irritating effects of swallowed saliva saturated with the anesthetic, while others, and myself included, believe vomiting to be to a large extent simply a local manifestation of some general constitutional disturbance.

It was my good fortune for a period of twelve years to have full charge of the after-care of about 75 per cent. of the patients I anesthetized, and hence I had ample opportunity to observe their recovery from the anesthetic. I don't mind admitting that in that time I spent some very uncomfortable moments when being reproached by individuals who found the after effects of the anesthetic worse than the operation. In my endeavor to minimize such conditions, I tried different anesthetics, different combinations and different methods of administration, and I was struck by the fact that with the possible exception of short anesthetics under gas and oxygen, there seemed to be no definite relationship between the degree of vomiting an individual suffers and the amount of anesthetic, the method of administration or the length of time of the narcosis. I have seen patients vomit frequently and persistently after a short anesthesia for some simple surgical procedure, and others suffer little or

no gastric disturbance following a prolonged narcosis for a major operation. I therefore cannot bring myself to believe that these above-mentioned factors play more than a minor part in the etiology of vomiting.

It is perfectly true that some individuals are more prone to vomit than others, and that a certain amount of post-anesthetic vomiting is due to something other than the anesthetic. Persons of a highly neurotic temperament, those badly frightened and dreading the ordeal, are not likely to recover without considerable gastric distress. In this class of cases anoci association as recommended by Crile undoubtedly is of great benefit.

Every now and then we meet with a case with a marked idiosyncrasy for morphia, and the subsequent vomiting is due to this drug. I know of no way of avoiding this error except by careful questioning and omitting the preliminary morphia if there is any suspicion of an unusual susceptibility.

I believe that patients with a pre-existing dilated or displaced stomach are very likely to vomit more than others, and while I do not practice lavage as a routine, I think in this class we should be particularly careful to thoroughly cleanse and drain the stomach before leaving the table. There is no excuse to my mind for vomiting from the swallowing of ether saturated saliva. The buccal cavity should be kept dry by drains placed in the dependent cheek, or, as Dr. Gwathmey recently suggested to me, by a dentist's aspirator.

From the reports of others and from my own observations, I am led to believe that post-anesthetic vomiting is to a large extent the result of some general constitutional disturbance involving the body metabolism and resulting in the formation of toxic substances of an acid nature, and that the best means of preventing such vomiting lies in the adoption of certain precautionary measures previous to the period of induction.

A few years ago I was called upon to anesthetize the wife of one of my most intimate friends. She was particularly apprehensive about the anesthetic because a previous experience had resulted in a prolonged emesis. The operation was a simple one, a perineal repair, and the period of anesthesia was less than thirty minutes. I used nitrous oxide gas and oxygen with the addition of less than half an ounce of ether at the onset. There was nothing unusual about the anesthesia, and the patient left the operating room fully conscious, having had some subconscious gagging as she awoke. About twelve hours later she began to vomit. When I saw her some forty-eight hours after the opera-

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tion, I found that she had been vomiting persistently. The vomitus was scanty and of a distinct coffee ground character. Her restlessness was intense, constantly tossing about the bed, and her lips and sides of her mouth were excoriated from the constant passage of gastric contents. Her pulse was rapid and feeble and she had the expression of a patient suffering from a profound shock, and looked as if she was rapidly going *sous ground*. A pronounced fruity odor to her breath and the presence of acetone in her urine led us to believe that she was a case of post-operative acid intoxication, and the prompt application of the proper remedies saved her life, though her convalescence, due to the profound exhaustion, was a protracted one.

It takes an experience of this kind to awaken one, and I immediately began to search the literature for information. I was rewarded by finding many excellent contributions upon the development of acid intoxication following anesthesia, upon the relationship of this condition to post-anesthetic vomiting and upon its therapy and prophylaxis. Caspar, Langenbeck, Guthrie, Bevan and Faville report cases following the use of chloroform under the caption of the so-called delayed chloroform poisoning. Becker, Rhamy, Brewer, Fren, Waugh, Brockett, Stone and Low give their experience after ether, while Chalfant reports from a study of 700 cases the relations between post-operative vomiting and acetonuria. I can find no reference to the development of this condition after nitrous oxide, but it so happens that the worst cases we have had in Baltimore, and in fact two fatal cases that I have been told about, followed short anesthetics under gas and oxygen. The therapeutic and prophylactic sides of the question have been thoroughly treated by Marchand, Bresley, Biddart, Wallace and Gillespie, so you see I am indeed simply calling your attention to an old subject.

The clinical pictures presented by these cases resemble more or less the case previously described, the symptoms varying with the intensity of the intoxication, and the fatal cases terminating in coma. It is hardly within the scope of this paper to go into the theories regarding the physiology of acid intoxication, or the part the anesthetic plays in its etiology other than to say that acetone forms in the system as the result of abnormal fat metabolism, that the complete combustion of fats requires the simultaneous katabolism of carbohydrates, in the absence of which there is a defective and abnormal course of fat metabolism, resulting in the formation of various fatty acids and acetone. This carbohydrate deficiency, barring outside influences such

as starvation or restricted diet, results from some disturbance in the glycogen-storing functions of the liver. What part does the anesthetic play in this glycogenolysis? It must be either due to some direct destructive action on the part of the anesthetic upon the liver cells, or else, as MacLeod suggests, to some action upon the splanchnic nerves controlling the glycogen output.

At all events, from a practical standpoint, we are dealing with bad conditions, a toxemia of an acid character and a carbohydrate deficiency. Common sense would seem to suggest the employment of an alkali and a sugar. Bresley in a series of articles describes his results in the treatment of acid intoxication both from a therapeutic and prophylactic standpoint, with bicarbonate of soda. Those treated after symptoms developed rapidly improved, and those treated before operation recovered without any vomiting. He lays great stress upon pushing the soda until the urine is alkaline, reporting cases with absolutely no vomiting, and I wish also to emphasize this point. Later Biddart also reports his results with the use of glucose as a prophylactic, giving half an ounce every four hours for six doses. Wallace and Gillespie draw their conclusions from a study of three series of cases, treated (a) with soda, one-half drachm every four hours until half an ounce has been taken; (b) with glucose, half an ounce every four hours for six doses; and (c) with no treatment. They believe that the carbohydrate treatment is more effective as a prophylactic to control vomiting than the alkali, but that the alkali is more efficacious after symptoms have developed. In the control series where neither was used there was distinctly more vomiting than in either of the other two groups of cases.

I could see no reason why both an alkali and a carbohydrate should not be given both before and after anesthesia. Accordingly I began giving patients one drachm of soda bicarbonate and one drachm of lactose every four hours for at least forty-eight hours before operation. I purposely gave a small dose of carbohydrate in accordance with Taylor's theory that a small amount of carbohydrate is sufficient to check an acidosis. If upon admission to the hospital the urine was acid, the dose of soda was increased so as to have the urine alkaline at the time of operation. Immediately upon returning to the room the patient is given a 5 per cent. solution of sugar per rectum by the Murphy drop method, using usually about 250 c.c. or 300 c.c. at a time. Sips of a 2 per cent. soda solution are given repeatedly for the first day and upon the second and third days 30 grains are

given every four hours. The sugar solution is repeated on the second day and later until the patient is on a diet sufficient to prevent any carbohydrate starvation.

Following out the theory of Waugh that a too restricted diet or excessive purging might be conducive to subsequent acidosis, Dr. Stickney of the Woman's Hospital has rearranged the preliminary routine prior to operation. He gives a purge of castor oil forty-eight hours before operation, and an enema the night before, repeating same in the morning until the fluid is clear. If the patient enters the hospital within twenty-four hours of time for operation the purge is omitted and the bowels emptied only by enemata. Regular diet with plenty of starchy food is maintained until noontime of the day before operation, then a slight supper and albumen and sugar water at midnight. Of course, this régime varies somewhat according to the nature of the operation.

Our results have been most astonishing. We have had no cases of severe vomiting and many with absolutely none at all.

Formerly vomiting was looked upon as to be expected, now it is the exception. Of course, one will say that frequently cases recover without any vomiting. This is perfectly true, but the most striking evidence of the part an acid intoxication plays in post-anesthetic vomiting and the efficacy of prophylactic treatment is seen in those patients who have had several anesthetics, giving a history of severe vomiting with no prophylactic treatment and none at all when properly protected against an acidosis. I believe that nearly everyone develops more or less of an acidosis after a general anesthetic. Whether they will show symptoms of an intoxication or not depends upon the eliminating powers of their kidneys. In a series of cases we examined the urine before and after anesthesia for acetone and found it present in nearly every case after operation. The degree of acetonuria, however, was of no prognostic value in determining the possibility or probability of an intoxication for the reason just given. There is no doubt that some individuals are more prone to subsequent intoxication than others. Children are very susceptible. Patients with a wasting disease, those with pre-existing vomiting as a symptom of their surgical ailment, are the ones to look out for. I have also been very much impressed with the apparent close association between nervousness and fright and subsequent acidosis.

I regret exceedingly that I have been unable to substantiate my remarks with detailed statistics of

a given number of cases. Scattered as they have been in different hospitals, I can base my conclusions only upon the opinions of patients, nurses and surgeons. These seem so uniformly favorable to the benefits derived from prophylactic treatment of post-anesthetic vomiting on the supposition that it is largely the result of an acid intoxication that I feel justified in calling this society's attention to the subject in the hopes that its efficiency will be tried by others.

### THE INFLUENCE OF ANESTHESIA ON ACIDOSIS.\*

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The energy of the body which, in different ways is derived from the environment, is temporarily stored in the several organs and tissues until in response to some adequate stimulus it is transformed into heat or motion. Prominent among the products of this transformation of latent into kinetic energy are acids. We may say that every motion, every emotion, every injury, every physical exertion, every degree of fever, every reaction to infection or to autointoxication, every respiratory movement, every heart beat, produces an acid. Under normal conditions these acids are neutralized into harmless compounds, which are eliminated by the kidney, so that under normal conditions the body tissue and fluids are for the most part slightly alkaline. If every activity of the body produces acidity in a greater or less degree, it is vitally necessary for the body to maintain a large margin of safety against acidosis by the presence of alkaline salts and bases, which are derived from food.

Experiments have shown that for the maintenance of its normal state of slight alkalinity, the body is dependent primarily upon the liver, and secondarily upon the adrenals. When the liver is excised the blood soon loses its slight alkalinity and in a few hours becomes acid. When the adrenals are excised the alkalinity of the blood is maintained for a longer period, perhaps twice as long, but it then becomes acid, and in each case the acidity of the blood is the close precursor of death. The excision of no other organ in the body produces this tendency to immediate acidosis.

We cannot dwell here upon other experimental observations which show the relative activities of the liver and the adrenals in this neutralizing

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process, nor the evidence that the liver and the adrenals are directly controlled by the brain, which also controls the transformation of energy, which in turn, as we have already stated, always produces acidity; we will merely recapitulate by saying that the harder the body is driven by any stimulus, the more rapidly will latent energy be transformed into kinetic energy. The more rapid the transformation of energy, the greater the production of acid. The greater the production of acid, the greater also the strain upon the power of neutralization possessed by the liver and the adrenals, and the greater the drain upon the body's store of alkalies and bases. When the liver and the adrenals are overtaxed, and the alkalies and bases are exhausted, the state of acidosis is reached.

Clinically it has long been recognized that when a patient is in a state of exhaustion resulting from infection, from injury, from shock, from starvation, from hemorrhage, or from any other cause whatsoever, he may never recover consciousness after the administration of a general anesthetic. In a Hungarian reference, the title of which I do not recollect at the moment, it is shown that starved dogs inevitably die after inhalation anesthesia. Clinicians know well how unsafe it is to give a general anesthetic of any kind to a patient on the verge of acidosis. A patient with chronic vomiting, with or without chronic pyloric obstruction, with an acetone odor of the breath, with peculiarly pink lips and dry tongue and mouth will in all probability never regain consciousness after being anesthetized. The aged not infrequently die after even a short anesthesia.

Why do not these patients recover? If the patient has the power of consciousness before the anesthetic is administered what happened during the anesthesia to make it impossible for the patient to regain consciousness?

We have already referred to the acid-producing power of stimuli. Shall we conclude therefore that the trauma of the operation alone may have pushed beyond the margin of safety the neutralizing powers of the body already taxed by pre-existing conditions; or is the anesthetic itself a factor in producing the fatal result?

To answer this question, Dr. Menten in my laboratory made for me observations of the H-ion concentration of the blood under various conditions—the H-ion concentration being an index of the acidity of the blood.

H-ion concentration tests were made after the application of many kinds of stimuli, the results of which confirmed the postulate which we have al-

ready stated, that acidity is the result of the activation of the body by any adequate stimulus. The blood was then tested to determine the H-ion concentration in ether anesthesia, in nitrous oxid anesthesia, and after the administration of alcohol and of morphin. Both ether and nitrous oxid produced a marked increase in the H-ion concentration, that is, both produced acidity in the blood. After coming out from the anesthetic this acidity was neutralized by the animal in about thirty minutes. This result gave us our clue to the tendency to acidosis and to death after anesthesia of weak and emaciated patients. The increased acidity produced by the anesthesia was sufficient to overcome the already narrow margin of safety. That acid intoxication *follows* the administration of ether and chloroform has been noted by many observers, the acidity being evidenced by the early appearance in the urine of acetone and later diacetic acid. It has also been noted, as one writer states, that the "starvation preceding and following the operation is also a factor of considerable importance."

Our experiments have shown, however, that the increased acidity actually develops *during the anesthesia* itself, sometimes to a fatal degree, and that a starved condition is not only of "considerable" but of *prime* importance, since it means that the acid-neutralizing power of the liver has been purely impaired, if not possibly lost.

Two more important clues were obtained from the result of the H-ion concentration tests after the administration of morphin and of alcohol. Alcohol caused acidity, the acidity not being so marked, however, as that produced by the anesthetics. The H-ion concentration was not altered by morphin, no matter what the size of the dose. When the administration of morphin preceded the induction of anesthesia then a smaller amount of the anesthetic was required to produce complete anesthesia, and the H-ion concentration test showed that the acidity was markedly less than in anesthetized animals which had not received the preliminary dose. The preliminary dose of morphia not only lessened the degree of acidity produced by the anesthetic, but it in no way interfered with the return of the blood to its normal alkalinity; on the contrary, and the following observation is of great significance, if morphin was given *after* acidity had been produced by the anesthetic, it postponed the time of neutralization, and if given in large doses *prevented* the animal from overcoming the acidosis. That is, it would appear that morphin controls the mechanism which governs the neutralization of alkalization of the blood.

These H-ion concentration or acidity tests of the blood have therefore given us the clue and an invaluable clue to the treatment of patients with mild acidosis or in whom acidosis is threatened. Since in every case the presence of diseased conditions is undoubtedly producing a mild acidosis, needlessly long anesthesia is to be avoided, as the increased acidity produced by the anesthetic will diminish the patient's margin of safety. The degree of acidosis seems to be proportional not only to the length but to the depth of the anesthesia. Therefore the lightest possible anesthesia should be maintained. With starved patients, with patients whose vitality is at a low ebb, in whom acidosis is already markedly present, the inhalation anesthetic may be absolutely contraindicated. If an operation is mandatory it may be performed under local anesthesia, or in the analgesia of twilight anesthesia produced by the gentlest administration of nitrous oxid oxygen.

In cases of acidosis especially nitrous, oxid oxygen anesthesia is always the anesthetic of choice, for though our tests have shown that like ether it does produce acidity in the blood, unlike ether it is not a lipid-solvent; does not impair the immunity of the body, and to some extent conserves the energy in the brain-cells from exhaustion.

Although, as I have shown elsewhere, both the pre-operative and the post-operative use of morphin is of great value in certain cases, in these cases of existing or threatened acidosis its use is contraindicated since it interferes with or prevents the neutralization of acidity in the blood, but bromides per rectum may be safely given to diminish the pre-operative psychic strain. The pre-operative administration of sodium bicarbonate and glucose is of value also.

To recapitulate: The ideal treatment for the class of patients we have been considering, those handicapped by exhaustion, in whom acidosis is present or is threatened, is:

1. The pre-operative administration of sodium bicarbonate and glucose and of bromides per rectum.
2. Ether twilight or a light nitrous oxid oxygen anesthesia.
3. A technic so accurate and so completely anociated by the use of local anesthetics and gentle manipulations that but a small amount of the anesthetic is needed.
4. As rapid a technic as is consistent with good work that the period of anesthesia may be as short as possible.

## INSUFFLATION ANESTHESIA.\*

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To produce anesthesia by the inhalation of volatile anesthetics is a difficult mechanical procedure, and the results of such an anesthesia, both immediate and remote, are often alarming. The mechanical difficulty is due to the obstruction presented by the upper respiratory tract, which is increased by the local action of the anesthetic. The evil and sometimes fatal results are due to overdosage and uneven dosage, chilling of the lungs by cold inspired air, aspiration into the lungs of foreign material, and fatigue from the undue load placed upon the respiratory system.

For these reasons inhalation anesthesia has fallen somewhat into disfavor; and local, spinal, intravenous, and colonic anesthesia have been tried in its stead. It cannot be denied that in many cases these alternative methods are expedient, but the necessity for their use has been greatly lessened by the introduction of an improved method of administering anesthetics by the respiratory route, insufflation anesthesia.

By "insufflation anesthesia" I mean the condition which is produced by blowing into the patient's pharynx or trachea a quantity of air or gas sufficient to supply all his respiratory needs without effort upon his part, containing an evenly distributed, and consequently non-irritating, minimum dose of the anesthetic agent.

It is now three years since I began the use of this method, and to-day, more than ever, I am convinced that, for the majority of cases, intratracheal insufflation is the best method, and pharyngeal insufflation the next best method, for administering anesthetics through the respiratory tract.

### ADVANTAGES.

*The first advantage* of insufflation anesthesia is that it prevents undue exertion of the respiratory system by overcoming the mechanical obstruction to the entrance of air, which exists largely in the patient's mouth.

*The second advantage* is that it permits of dosimetric administration; that is, all the air delivered to the patient can be measured, and can be supplied with an evenly distributed and measured amount of anesthetic per minute. The local action and reflexes caused by irritation when too concentrated an anesthetic is given, or when it is poorly

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mixed with the inspired air, are thus abolished. Dosimetric instruments which do not employ insufflation are very inaccurate because (1) they depend upon extremely variable factors, the respiratory rate and value of the patient, which are affected in turn by the anesthetic, and a vicious circle is often produced; and (2) they do not supply all the air required by the patient, and the efferent mixture is, therefore, diluted with varying quantities of air drawn in directly from the room.

Using the insufflation method, Connell, of New York, has devised an instrument—"The Anesthetometer"—which is absolutely accurate in dosimetry. This apparatus allows us to measure and record our dosage, and compare and standardize our results, so that we can place our empirical knowledge upon a scientific basis, and employ it not only to our own future advantage, but also as a basis of knowledge for those who would otherwise have to learn as we learned—by rule of thumb and personal experience.

*The third advantage* is that the anesthetic mixture can be warmed and moistened accurately. In this connection I have found in practice a grave fault in the warming apparatus of our instruments: the air and ether mixture, in passing over the hot water, picks up steam, some of which is condensed in the efferent tube. Surely, when this condition is present, there must be too much moisture in the mixture.

I had hoped to describe in detail in this paper a dry heater with separate moistener which is at present being made for the Royal Victoria Hospital, but it is not finished. However, the idea is this: The heater consists of a coil of copper tubing around which a wire resistance is wound. The heat of this apparatus is controlled by a rheostat, and the temperature of the anesthetic mixture which passes through the copper tubing is read from a thermometer placed at the beginning of the efferent tube from the instrument. The air is moistened after leaving the heater, so that too much moisture cannot inadvertently find its way into the anesthetic mixture.

*The fourth advantage* is that the danger of aspiration is overcome absolutely in intratracheal insufflation. In pharyngeal insufflation it is practically overcome; for, owing to the fact that the anesthetic is delivered behind the tongue and fauces, and that it is evenly distributed and diluted, it does not produce the hypersecretion found in inhalation anesthesia.

*The fifth advantage* is the improvement in the type of anesthesia produced; quiet breathing, ex-

cellent color, normal pulse and blood pressure, absence of venous engorgement, perfect relaxation, and quick, uneventful recovery.

*The sixth advantage* is that, in case of necessity, an ideal means of artificial respiration is already at hand. This is especially useful in intrathoracic surgery.

*The seventh advantage* is the ease of administration. The anesthetist needs to give only a small amount of his attention to the instrument, and consequently can take much more accurate care of his patient. Besides, he is not fighting for room and endangering the asepsis of the operative field.

#### TECHNIC.

In discussing the question of technic, two parts of the apparatus must be considered: (1) the instrument proper, and (2) the efferent tube system.

The instrument proper should give a respirable stream of air or gas, warmed and moistened, with which the anesthetic is evenly mixed. The operator should be able to control and register the volume of air or gas, the amount of the anesthetic, the temperature, and the moisture. A manometer and safety valve should be inserted into the efferent tubing to prevent any undue pressure reaching the patient's lungs, all of which requirements are fulfilled in the Connell anesthetometer.

The tubing system for carrying the anesthetic mixture from the instrument to the patient should, for intratracheal anesthesia, terminate in a catheter, which is inserted into the trachea down to a point three-quarters of an inch above the bifurcation. This catheter should have a terminal opening, and at least two lateral openings near the tip; it should be made of material which will stand repeated boiling; and its caliber should be relatively small compared with that of the trachea. It should be introduced under direct illumination, after the patient has been well anesthetized.

For pharyngeal anesthesia the tubing system should end in a Y-tube carrying two catheters, which are passed through the nose deep into the pharynx. For this method deep initial anesthesia is not necessary.

In actual practice in hospital I have used, for both kinds of insufflation, the Janeway Insufflation Apparatus. This instrument is not dosimetric. For intratracheal insufflation I use on an average 20 mm. pressure; and for intrapharyngeal insufflation, 30 mm. For introducing the intratracheal tube the Chevalier Jackson Pharyngoscope has always answered perfectly.

I have special tubes made for this work, which are almost rigid when cold, but soften up when

in use. They can be boiled many times without becoming rough.

For use outside the hospital I have made up an insufflation machine of the Gwathmey three-bottle inhaler, by substituting a small motor and pump for the foot-bellows and providing a safety valve with manometer, which I think greatly improves the original instrument.

Two things have prevented the more extensive use of insufflation anesthesia in our hospital:

(1) Although we have had no bad results from its use, some surgeons are prejudiced against intra-tracheal intubation.

(2) The noise of the instrument is very disagreeable, especially in a teaching clinic. This objection will, however, soon be overcome by the installation of a central compressed air plant in the basement with pipes carrying a supply to each operating room.

#### CONCLUSIONS.

(1) That insufflation is the best and safest means of introducing volatile anesthetics through the respiratory system.

(2) That accurate dosimetry can be applied to the insufflation method, and should be used when possible.

(3) That, if we wish to avoid bad results, we must follow carefully the principles laid down by Meltzer concerning the size and character of the tube and the method of insertion.

(4) That, if insufflation is used, especially if it is combined with measured dosage, the respiratory route can be chosen in a much larger percentage of cases, to the ultimate advantage of the patient, and the need for more extraordinary routes and methods of administration will to a great extent disappear.

104 SHERBROOKE STREET, WEST.

## LOCAL ANESTHESIA AS APPLIED TO THE RADICAL CURE OF VARIOUS FORMS OF HERNIA.\*

BY JAMES F. MITCHELL, M.D., F.A.C.S.,  
WASHINGTON, D. C.

Fourteen years ago, while resident surgeon at the Johns Hopkins Hospital, I had an unfortunate experience in the case of a father and two sons operated upon for inguinal hernia. At that time most of the hernia operations were done under general ether anesthesia. The boys made uneventful recoveries. Forty-eight hours after operation the father developed double pneumonia and died. A little later I saw a second death from pneumonia following an operation under ether for an umbilical hernia in a very stout woman. I realize thoroughly the great strides which have been made in the art of anesthesia since that time, and know that with present-day methods such occurrences must be extremely rare. It must be granted, however, that there is still a small element of danger in the very best hands. Where an operation can be as well and as thoroughly done under local as under general anesthesia, there is some advantage in the local method in that it adds one more factor of safety.

Since the occurrences related I have endeavored to eliminate as far as possible general anesthesia in all hernia operations. Dr. Harvey Cushing had already published his paper describing his method picturing the nerve supply of the inguinal region. During the first few years a general anesthetic was used occasionally, partly because the patient insisted upon it, partly because of our timidity in undertaking difficult cases. With increasing experience we have now reached the point where practically all hernias can be painlessly operated under local methods. During the past six or eight years a general anesthetic has never been given for a hernia operation unless there was some other coincident operative procedure which necessitated it. For a time recurrent hernias and large post-operative or umbilical hernias in very stout people were done under the combined method, but at present these offer little difficulty. It is also most gratifying to note that the various house officers have so acquired the habit through assisting at these operations that in their own cases local anesthesia is almost invariably used. The present resident surgeon at Providence Hospital has thus done sixty inguinal hernias during the past year. We find that in our clinic the knowledge of the method is

he first

\*Read during the Second Meeting of the American Association of Anesthetists, at Atlantic City, June 22, 1914.

### THE JANUARY SUPPLEMENT

**TREATMENT OF POST-OPERATIVE  
SHOCK.**

PROF. CHARLES LIEB  
Columbia University, New York

**CONTINUOUS ANALGESIA WITH  
SOMNOFORM—TECHNIC OF AD-  
MINISTRATION.** (Illustrated)

WM. HARPER DEFORD, D.D.S., M.D.  
Drake University, Des Moines, Iowa



passed from patient to patient, and not only do we rarely have any difficulty in persuading them to submit to the operation under local anesthesia, but as a rule they demand it and many come to us because of its use. Where one operation has been done under the local method, and a second becomes necessary, general anesthesia is never requested, but the local is insisted upon. Age and sex matter little. Our youngest case was nine years of age, the oldest ninety-seven. Exact figures have not been compiled, but our cases now number many hundred.

From the standpoint of the patient the advantages are evident. While absolute freedom from post-operative nausea and distension is not claimed, both are certainly lessened and, provided sufficient care is taken in the pre-operative preparation of the patient and in the handling of tissues, especially the parietal peritoneum, during the operation itself, they may be reduced to a minimum. I am thoroughly convinced that the preliminary hypodermic of morphia is responsible for much of the distension and nausea. The preparatory treatment should be the same as for a general anesthetic, with this exception, that a cup of coffee or a glass of milk may be given just before the operation. During the operation itself water may be taken freely and the patient is often allowed to smoke. It was at one time our custom to allow a resumption of normal diet shortly after the operation. It has been found, however, that this is not a good plan and that it is much better to limit the diet to liquids for the first twenty-four hours. Retention of urine is almost unknown and may be entirely avoided by keeping the patient in bed for twenty-four hours before the operation and educating him to the use of the urinal. There is some post-operative pain which usually appears within the first two hours and necessitates a small hypodermic of morphia, which should not be withheld.

As to the immediate results, healing is better than under general anesthesia, due most likely to the more careful handling of tissues. We have had no deaths and no post-operative pneumonias. A comparison of our ultimate results with those obtained under general anesthesia would be of no value; for it must be remembered that operations under local anesthesia have been done at a time when our knowledge of the necessities of successful hernia operations is so much better developed. There is no doubt, however, that every step of the operation can be as carefully and thoroughly

performed under local as under general anesthesia. The standpoint of the operator dissatisfac-

tion may be attributed primarily to hurry or lack of time, and secondly to insufficient familiarity with the details and requirements of local anesthesia. These operations undoubtedly require more time than when the patient is unconscious, but with increasing experience the time limit is reduced. Great speed, however, is obtained at the expense of pain, and the time required for an ordinary inguinal, femoral or umbilical hernia can with difficulty be brought under an hour. Naturally this is prohibitive where many cases are scheduled for one day. Another objection is the wear and tear on the operator; for one is more fatigued by the additional strain of the careful dissection and the effort to converse with the patient—a faculty which, however, is soon acquired by practice.

It is not necessary to describe those details which are essential in all local anesthesia operations; but suffice it to say that the patient should be in a comfortable position on a well padded table and quiet as far as possible should prevail in the operating room. The most satisfactory apparatus is the graduated Record syringe, glass with metal piston, of a capacity of 10 and 20 c.c., with nickel needles of varying size and length. In the great majority of our cases in the past cocaine has been the anesthetic; but this is rapidly being discarded in favor of the less toxic novocain. In either case adrenalin is added to intensify and prolong the drug action and to prevent absorption. One-tenth of one per cent. cocaine is sufficient for infiltration and one-half to one per cent. for injecting the nerves; or one-half per cent. novocain for infiltration and one to two per cent. for nerve injection. We have never seen toxic effects from cocaine in even the most extensive operations; but novocain solutions being so easily prepared and having the advantage of less toxicity, are certainly to be preferred.

We will describe the technic of the operations which have proven best in our hands for the various forms of the usual hernias with the idea of showing the use of the local anesthetic in the different steps rather than to exploit any particular type of operation.

#### INGUINAL HERNIA.

As was beautifully shown by Cushing, the inguinal region is especially adapted to regional anesthesia because of the fact that it is almost entirely supplied by two nerves, the ilio-hypogastric and the ilio-inguinal, which can be readily reached for blocking. It has been our custom to follow the method of Cushing and to anesthetize the skin separately. According to Braun the whole injection

is made before the skin is incised, the inguinal region being thoroughly infiltrated through one or more punctures and the nerves thus reached by diffusion. It is here necessary to wait from fifteen to twenty minutes before beginning the operation, while with a separate skin injection the incision may be made at once. In double hernias we sometimes employ Braun's method for the second operation, making the injection before starting the first incision so that anesthesia is well established by the time the first side is finished. The line of incision extends from a point one-third the distance from the anterior spine to the umbilicus, downward in the direction of the inguinal canal to a point slightly above the external ring. A skin wheal is produced with the weak solution the whole length of this line and through it the subcutaneous tissue is also infiltrated. By pinching up the skin tightly between the thumb and finger even the first needle prick may be made painless. The needle may at the same time be carried through the external oblique and some of the solution distributed between it and the internal oblique. The skin incision is made and in the upper part is carried down directly to external oblique. The line of the inguinal canal, marked usually by a thinned out area in the external oblique is now readily observed. Along this line an incision is made in the direction of the fibers of the external oblique and the muscle flaps retracted with a couple of clamps. The ilio-inguinal nerve is immediately exposed running to the outer side of the cord towards the external ring. This is injected with the stronger solution, the needle being thrust into the substance pointing centrally. In this way dragging on the nerve is prevented and the injection is painless. The ilio-hypogastric nerve is found lying usually along the lower border of the internal oblique running towards the median line and perforating the external oblique at the outer edge of the rectus muscle. This nerve is likewise injected. Unless this is done before the lower part of the subcutaneous tissue is divided unanesthetized nerve fibers may be cut, causing some pain.

The nerves are subject to great variation, but not enough to cause any difficulty in their exposure or identification. The skin and subcutaneous tissue being widely retracted, the incision is continued parallel with the fibers of the external oblique directly through the external ring. The edges of the external oblique are retracted and the nerve dissected free and held to one side with the clamps on the muscle edges. The cremaster is now divided in the same way in the direction of its fibers and in

the case of an oblique hernia the sac and cord are exposed. If the hernia be direct the sac is found lying to its median side. A diffuse injection of the weak solution is made all about the neck of the sac and if possible is carried well up beyond its neck in the subserous connective tissue about the parietal peritoneum. It is not necessary at this stage of the operation, if the sac presents, to expose the cord. The sac is opened and its contents reduced or excised as may be indicated. It must be remembered here that omentum or intestines, which may present in the sac, have no sensation, and no pain is experienced in their handling unless traction is made from below. Omentum may be freely excised or the intestines resected without pain provided traction is avoided.

We frequently at this stage remove an appendix, which may be presenting in the hernial sac. The sac being widely opened and its contents cared for, a long needle is introduced from within the sac just beneath the peritoneum, and a further injection made to insure complete anesthetization of the neck of the sac and parietal peritoneum above. The neck can be readily recognized by a dense white band indicating a thickening in the peritoneum. It is in the line of this band that the infiltration is best made. Pulling upon the sac without this thorough anesthetization will cause pain, pallor, nausea and even severe vomiting. The sac is now cut across close to the neck and being dissected free from the surrounding structures is closed high up with a purse-string suture of fine silk. The ends of this suture are left long. A finger is passed within the internal ring and with it as a guide the ends of the purse-string suture are threaded one at a time on a curved needle and carried up beneath and through the internal oblique, carefully avoiding the ilio-hypogastric nerve. They are tied on the anterior surface of the internal oblique, thus leaving the neck of the sac fixed high above the exit of the cord. By dividing the sac at this early stage of the operation, the removal of its lower part is done without any discomfort whatever, peritoneal sensation having been interrupted.

From this point on little or no care is necessary as far as pain is concerned. The remaining steps differ with different operators. The cord may be transplanted or not. It is our custom in hernias in adults to transplant the cord in the majority of cases. It is gently lifted from its bed and suspended on a piece of gauze. The muscle layers being isolated the sutures are now introduced. Our present suture material is fine linen. The first stitches include on the median side cremaster, in-

ternal oblique and conjoint tendon and possibly the edge of the sheath of the rectus muscle as close as possible to the pubic spine. Passing under the cord the cremaster is again picked up and the needle is introduced from within through the lower part of Poupart's ligament close to the pubic spine on the outer side. The needle is now carried back through cremaster, under the cord, and the suture is tied. Three or four of these are placed beneath the cord, bringing over the internal oblique to the under surface of Poupart's ligament. In the case of muscular weakness or atrophy of conjoint tendon the rectus is readily transplanted without further application of the anesthetic. In direct hernias the sac offers more difficulty because of the surrounding fat, and here we always transplant the rectus. It may sometimes be necessary to divide the epigastric vessels in order to thoroughly free the neck of the sac in direct hernias. The row of deep stitches is continued upward until strong internal oblique muscle is sutured to Poupart's ligament beneath the cord. One similar stitch is taken above the cord. As a rule when these are all placed the point at which the sac is attached can be seen well above the last suture. The cord and the two nerves which have been carefully protected are allowed to drop back into place on top of the internal oblique. The lower flap of external oblique is brought over the cord and sutured to the anterior surface of the internal oblique with fine linen, silk or catgut. The upper flap is overlapped and sutured to the anterior surface of the lower flap with similar material. The deep fascia may be brought together by two or three sutures of catgut and the skin is closed with a running through and through fine silk stitch. Ordinarily a small protective wick is brought out at the lower end of the incision. This has never given trouble and is removed at the first dressing, which is done from the eighth to the tenth day. Iodine preparation is ordinarily used and a dry gauze dressing over which a starch bandage is placed in order to prevent unusual motion for the first few days. Distention is relieved by enemata and the bowels usually moved in forty-eight hours. The patients are allowed to be turned immediately after the operation; but are kept flat in bed for about ten days, when they are gradually propped up and are allowed out of bed in from two weeks to sixteen or seventeen days. This usually means a maximum hospital stay of about three weeks, with a period of discomfort which rarely lasts through the first forty-eight hours and in most cases does not exist.

#### RECURRENT HERNIAS.

These offer little more difficulty as far as obtaining anesthesia is concerned. The incision must be carried higher in order to expose the nerves well above the old scar. These being injected, the operation may be carried out with as great precision and as much ease as where general anesthesia is used. The method of injecting the nerves separately after their exposure is in these cases undoubtedly much more satisfactory than a diffuse injection through several points before the skin incision is made; for the scar of the previous operation renders a diffuse injection most difficult. In very fat subjects it may be difficult to locate the nerves, but by first dissecting off the layer of fat which surrounds them they may be readily exposed. Recurrent hernias naturally offer greater difficulty from a technical standpoint because of the scar tissue and the fact that often one is not familiar with the nature of the operation which has been done before.

#### FEMORAL HERNIA.

The femoral hernia offers a good field for the diffuse primary infiltration of Braun, although here also we use a separate skin injection. The line of incision extending perpendicularly over the femoral canal is injected thoroughly with a weak solution and through this the needle is thrust all about the prominence of the hernia. Care has to be taken not to injure the femoral vein which lies in close apposition. The needle is also carried through the external oblique above Poupart's ligament and a diffuse injection made beneath this muscle to block fibres of the ilio-hypogastric and ilio-inguinal which may run into the femoral region. Dissection of the sac is then very readily accomplished. When the sac is dissected free a second injection should be made close about the neck of the sac and this should be carried well up within the femoral ring in order that a high ligation of the sac may be made. The contents of the sac may then be treated in the same way as in an inguinal hernia and the same precautions observed as to dragging on the mesentery. We have resected small intestine with good result in a patient eighty-four years of age in a strangulated femoral hernia. The sac being opened and its contents disposed of, the neck is thoroughly freed and ligated as high as possible with a purse-string suture of fine silk. The lower portion is removed and the stump allowed to retract within the femoral ring. The closure of the femoral ring involves no sensitive tissues and the sutures can be placed with absolute freedom from pain. One or more mattress sutures pass through Poupart's ligament picking up pectineus muscle or

fascia, then the fascia about the femoral vein, and back through Poupart's ligament. The skin is closed with a continuous through and through fine silk stitch. The patient may be allowed to get up in two weeks. We have never seen a recurrence after this operation.

#### UMBILICAL HERNIA.

The nerve supply in the umbilical region is diffuse and the regional method does not here apply. The circumscribing diffuse injection of a weak solution, however, renders operation extremely simple and painless. We are accustomed to using a double elliptical incision, which includes the umbilicus. The skin in the line of incision is injected with the weak solution and before the skin incision is made a long needle is carried down along the hernial sac until muscle is reached. The whole region of the hernial protrusion is thus bathed with the weak solution by a circumscribing injection. The skin incision is made and the dissection slowly carried through the fat, and any large vessels or prominent nerve fibers which may be encountered are given a separate injection before being divided. When the muscle is reached the dissection is carried close to the neck of the sac until it is well isolated. A needle is then introduced into the sac wall and the whole region of the neck is well infiltrated and the peritoneum injected as far as possible on all sides. The sac is cut across flush with the muscle wall. In doing the Mayo operation it is well now to introduce the needle through the muscle and to inject well the subserous connective tissue. In case a large amount of solution has been used in getting to this stage of the operation it may be better to inject the peritoneum only at the points where the needle will be introduced for the placing of the sutures. In this way the stitches can be easily placed and tied. The external layer of sutures offers no difficulty.

The use of local anesthesia for umbilical hernias in very stout people is most highly recommended. It is just these patients who in the past have been most likely to develop pneumonia after a general anesthetic and the operation can be so readily and so painlessly done that the advantages of the local method are at once evident. We have been able to carry to a successful termination most extensive umbilical hernia operations. I recall one case especially in which a woman weighing some three hundred pounds had a very large hernia which contained many feet of adherent small intestine as well as the transverse colon and omentum. The operation would have been necessarily long, even under a general anesthetic. Under local anesthesia

it required three hours for its completion. The hernial opening, after the sac was excised, and its contents reduced measured about 15cm. in diameter. We were able to get a good firm overlapping closure and the patient recovered from the operation with no nausea, no shock, and now after several years is entirely well. The abdominal wall is strong and she has had no suggestion of recurrence of the trouble.

It is in these large operations especially that novocain with its lower toxicity offers such distinct advantages in the field of local anesthesia. Many post-operative hernias come under the same category, and we are beginning to rely on local anesthesia for operative work in this line more and more. The dissection of the muscle layers in these troublesome operations is naturally extremely tedious and difficult, but with patience and a careful introduction of abundant anesthetizing fluid the hernia of this type, which cannot be as successfully treated under local anesthesia as under general, is extremely rare.

We believe more and more that all types of hernias can be operated under local anesthesia. It is simply a matter of time, patience, familiarity with details and sufficient experience. That an extra factor of safety is thereby added is sufficient reward for the additional wear and tear on the surgeon himself.

## THE JANUARY SUPPLEMENT

### THE PROPER DEPTH OF ANESTHESIA.

WILLIS D. GATCH, M.D., F.A.C.S.  
University of Indiana Medical School,  
Indianapolis, Ind.

### PERCENTAGES IN NITROUS OXID-OXYGEN ANESTHESIA.

KARL CONNELL, M.D., F.A.C.S.  
Roosevelt Hospital, New York

### REBREATHING IN ANESTHESIA AND ANALGESIA.

E. I. McKESSON, D.D.S., M.D.,  
Toledo, O.

### THE ADVANTAGES OF COMBINED ANESTHESIA IN THE OPERATIVE TREATMENT OF HEMORRHOIDS.

ISADORE SEFF, M.D.  
Beth Israel Hospital, New York

### MEDICO-LEGAL ASPECTS OF ANESTHESIA AND ANALGESIA.

A review of American and Continental Court decisions involving the relations of the Anesthetist and Surgeon to Anesthesia, Analgesia and the Law (1914).

# American Journal of Surgery

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F. HOFFER McMECHAN, A.M., M.D., Editor  
Cincinnati, Ohio, U.S.A.

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"Friar Laurence:      Take thou this vial,  
And this distilled liquor drink thou off,  
When, presently, through all thy veins shall run  
A cold and drowsy humor; for no pulse  
Shall keep his native progress, but surcease;  
No warmth, no breath, shall testify thou liv'st;  
The roses in thy lips and cheeks shall fade  
To pale ashes; thy eyes' windows fall,  
Like death, when he shuts up the day of life;  
Each part deprived of supple government  
Shall, stiff and stark and cold, appear like death,  
And in this borrowed likeness of shrunk death  
Thou shalt continue two and forty hours,  
And then awake as from a pleasant sleep."

*Romeo and Juliet.*

### INTRODUCTORY.

The editorial policy of this SUPPLEMENT will be one of *service*.

For the first time in the history of medical journalism a journalistic medium is being provided for advancing the science and practice of anesthesia and analgesia, and for improving the status of the anesthetist. Needless to say the energies of the EDITOR and his ASSOCIATES will be devoted to making the SUPPLEMENT subserve the useful purposes for which it has been founded.

Primarily established as a medium for progressive anesthetists, medical and dental, and their organizations, for the exchange of experiences and the comparison of methods, the SUPPLEMENT is also intended to actively serve the interested surgeon, and to be a complete and reliable source of practical information for the large body of practitioners who include the administration of general anesthesia and the use of local analgesia among their accomplishments.

To maintain an editorial policy of *service*, the EDITOR requests those interested to favor the SUPPLEMENT with their original contributions, clinical or experimental, first hand; and he cordially invites associations of anesthetists to utilize the SUPPLEMENT for the publication of their transactions.

In conclusion the editor wishes to extend his heartiest thanks to those whose assistance has made the issuing of this SUPPLEMENT a possibility, and to acknowledge his debt of gratitude to those associates, who by their personal co-operation are giving the SUPPLEMENT a national and international scope. Also the editor solicits the continued support of all those who may appreciate the *service* which the SUPPLEMENT will provide.—F. H. M.

### A MARTYR TO THE CAUSE OF MEDICAL KNOWLEDGE.

A fact scarcely known, but well worth recording, is that the American edition of Prof. Dr. Heinrich Braun's "Die lokal Anasthesie" cost the translator his life.

Dr. Percy Shields, of Cincinnati, spent a number of months with Prof. Braun in his clinic at Zwickau studying the most recent advances in analgesia. On returning home his health failed him, but he guarded the secret closely from his family and most intimate friends. His personal diagnosis of leukemia was later corroborated by experts at Johns Hopkins.

Had Dr. Shields then elected invalidism he might have prolonged his life indefinitely; but with a true scientist's disregard of fate he plunged into the work at hand, and spent the very remnants of his vitality in accomplishing his purpose.

He spent the silent watches of the night at his desk, pen in hand, his sole companion the Grim Reaper opposite, both watching the sifting sands in the hour-glass of life. Nor did Dr. Shields falter or complain. When the pen fell from his lifeless fingers, death picked it up and wrote "Finis" to his task. He was denied even the consolation of seeing his work in print. The editing of the manuscript and proofs was completed under the friendly auspices of Dr. Otto Juettner, the medical historian.

In behalf of the world's progress one man sacrifices existence to conquer Culebra cut; another becomes a martyr to the cause of medical knowledge. It is the heroism of workaday life that transcends the glories of war and the honors of pomp and circumstance.

Would that each of us could be as one of these:  
F. H. M.

## Book Reviews

*A carefully selected library is essential to a thorough knowledge of the science and practice of a specialty.*

**Anesthesia.** By JAMES T. GWATHMEY, M.D. Anesthetist to the New York Skin and Cancer and Columbia Hospitals and St. Bartholomew's Clinic; President of the American Association of Anesthetists; in Collaboration with CHARLES BASKERVILLE, Ph.D., F.O.S., Professor of Chemistry and Director of Laboratories in the College of the City of New York. Octavo, 319 practical illustrations. Cloth, \$6.00. D. APPLETON & Co., New York, 1914.

The progressive practitioner, who has come to regard modern anesthesia as something more than rendering the patient insensible to pain, can certainly inform himself on the safest, most convenient and most helpful methods of administration in this recent volume of Gwathmey and Baskerville. It is an eminently practical and thoroughly exhaustive work, containing the very latest knowledge upon every form of anesthesia and analgesia, and it has been compiled with the assistance of some of the foremost experts in the United States.

As an inventor of important anesthetic apparatus, a master administrator of long service and a scientist of marked ability, Gwathmey was fully equipped to prepare a work on this vital subject, and his volume, which appears after several years of preparation, deserves to be ranked with the classics of Snow, Hewitt and Braun.

Baskerville, whose elaborate investigations have established new and higher standards of purity for anesthetic agents, has collaborated with Gwathmey in revising and preparing the chemical side of anesthesia. An interesting feature which he has supplied being a complete list of all substances ever used for anesthesia, with a full description of each.

In the preparation of this work of exhaustive scope Gwathmey has judiciously divided honors with such other renowned collaborators as Bainbridge, Crim, Elsberg, Frink, Gatch, Mitchell, Prinz, Robinovitch, Sutton and Walsh, and consequently the volume stands as a monument to the hitherto unacknowledged worth of American investigations in the science and practice of anesthesia and analgesia.

After a cursory, but interesting consideration of the Historical Evolution of Anesthesia, Gwathmey plunges into a review of all the theories on the underlying physiology of inhalation anesthesia from the original theories of Herbert Spencer to the very latest investigations of Verworn and Lillie. In this connection Gwathmey again emphasizes the value of warmed anesthetic vapors and concomitant oxygenation, factors in the successful administration of anesthetics which have now received the endorsement of almost all American as well as continental authorities.

The chapter on Rebreathing is the same masterly exposition of the subject which drew the attention of the whole profession to Gatch during his work at Johns Hopkins. It is one of the most valuable contributions ever made to present day methods of anesthetic practice.

Nitrous oxid is comprehensively dealt with particularly as regards its technic of administration and the various apparatus devised for the purpose, detailed consideration being given to the researches and technics of Hewitt, Gatch, Davis, Teter, Woodsey, Boothby and Cotton; the nasal, endo-tracheal and intra-tracheal methods being enlarged upon.

In the chapters devoted to ether and chloroform, while the drop method is described, as perfected by Ferguson, the vapor method of administration is advocated, and the superior advantages of the Gwathmey, Roth-Draeger, Pinneo and Connell devices are explained. Connell's brilliant elucidation of the surgical planes of narcosis in relation to the percentage-strengths of anesthetic vapors is given the space it deserves.

In discussing the various anesthetic technics for special operations, the value of the water vacuum aspirator and the French chair-table are illustrated and their advantages described.

The chapter devoted to treatment before, during and after anesthesia is replete with suggestions of the most practical kind and are in accord with the most recent observations and conclusions regarding acidosis.

Sutton reviews his experiences with the colonic absorption of ether-oxygen as an introduction to Gwathmey's more recent technic of oil-ether rectal anesthesia, a method that gives promise of being retained as a permanent technic for special operative procedures.

While the chapters on local anesthesia in general surgery by Mitchell and in dentistry by Prinz cannot compete in scope with such monographs as Braun and Fischer, they serve the purpose for which they were included as do the chapters devoted to mental influence in anesthesia by Walsh and hypnosis by Frink. Louise Robinovitch contributes a comprehensive treatise on electric analgesia, sleep and resuscitation, and opens up a field of research pregnant with great possibilities.

Bainbridge in his usual felicitous manner handles the subject of spinal analgesia and anesthesia with a knowledge born of long experience and routine success.

Crim's consideration of the medico-legal status of the anesthetist serves as a welcome introduction to the subject in this country and the rapidity with which decisions involving the anesthetist and his special work are accumulating, emphasize the importance of the subject.

The concluding statistics are intensely interesting as perhaps the most complete that have ever been collected, and they serve to throw some disconcerting sidelights on preconceived notions of anesthetic fatalities.

For the anesthetist who wants one book to adequately serve all his needs, this volume of Gwathmey and Baskerville certainly answers the purpose, and for the expert with a library of literature on the subject, it will be the book to which he will most frequently refer.

**Text-Book of Local Anesthesia For Students and Practitioners.** By PROF. DR. GEORGE HIRSCHL, Heidelberg. With an Introductory Preface by PROF. DR. WILMS. Translated by RONALD E. S. KROHN, M.D., London. 103 illustrations in Text. WILLIAM WOOD AND Co., New York, 1914.

Local and regional anesthesia have nowadays assumed great importance in operative surgery. Commensurately with this evolution, the technic has become a procedure, demanding almost as much dexterity and experience as the operation itself. In order to assist, a plastic conception, which is the prime requisite for every conduction anesthesia, Hirschl has collated various satisfactory methods from personal and authoritative sources, and has facilitated their understanding by copious illustrations. These remarkable clear illustrations have proven a valuable aid to both Hirschl and Wilms in teaching the subject in their clinics, and they should subserve the same purpose to the intelligent reader, seeking technical information regarding the routine methods of local and regional anesthesia.

After an historical survey of the subject, Hirschl reviews the indications and contraindications for local anesthesia; discusses the preparation of the patient and the worth of the various analgesic agents, as well as the necessary instrumentarium. This general consideration is followed by a concise, yet exhaustive exposition of those technics which have proven themselves the most expedient for specific operations in all parts of the body.

The translation is exceptionally readable and the translator, Dr. Krohn, has added to the original text, the latest bibliography of the subject and a convenient index. As a practical exposition of local and regional anesthesia, exquisitely illustrated, this manual is in a class of its own.

**Anesthetics. Their Uses and Administration.** By DUDLEY WILMOT BUXTON, M.D., B.S., M.R.C.P., Some-time President of the Society of Anesthetists; Anesthetist and Lecturer, University College Hospital, London, etc., etc. Fifth edition. Small octavo; 477 pages; 84 illustrations. Philadelphia. P. BLAKISTON'S SON & Co., 1914. Price, \$3.00.

A fifth edition of this standard work needs no review. To the many who are familiar with its merits it will be

sufficient to say that in this issue the author has omitted much material that has become obsolete since the last edition, and has included ample descriptions of the newer procedures of anesthesia and analgesia, the various methods and apparatus that have made the administration of anesthetics more complicated and correspondingly more precise. He explains, for example, the rationale of Meltzer's intratracheal insufflation, illustrates several of the apparatus devised for its employment, and describes both the indication and the technic. Nitrous oxide-oxygen narcosis is accorded the space that this method has, in recent years, come to deserve. Spinal and regional anesthesia are considered at length, and many new illustrations have been introduced to make clearer their precise administration. The employment of alkaloids of opium and hyoscyamus in narcosis is also briefly reviewed. As before, the work aims to teach the scientific, rather than the routine in anesthesia methods, to establish reasons rather than mere rules.

**Local Anesthesia.** By DR. ARTHUR SCHLESINGER, Berlin. Translated by F. S. ARNOLD, B.A., M.B., B.CH. (Oxon). Duodecimo; 211 pages; illustrated. New York: REBMAN CO., 1914. Price, \$1.50.

This small work should prove a very useful one for beginners in the field. It deals with the subject from a purely practical standpoint, so those interested in the theory or the chemistry of local anesthetics must seek detailed information elsewhere.

The work is up-to-date in nearly every respect and the logically established views of the author are clearly set forth. The only important adverse criticism that can be made of the book is that the translator has adhered too closely to the German form, and, in consequence, sentences are encountered here and there that are very ungainly or almost unintelligible.

## Index and Abstracts

A Résumé of the International Current Literature of Anesthesia and Analgesia.

**EDITOR'S NOTE:** *Authors of pertinent articles, who desire to have them indexed and abstracted, are cordially invited to send copies of the journals containing their contributions, direct to the editor, immediately on publication. Also the receipt of reprints for filing and reference will be duly appreciated.*

**ACAPNIA, ITS RELATION TO ANESTHESIA AND SURGERY.** C. G. Parsons, Denver, Colorado Medicine, June, 1914.

**ADMINISTRATION OF AN ANESTHETIC (CHLOROFORM).** Bernard Higham, Rawal Pindi, India, Indian Medical Gazette, also Medical Brief, July, 1914.

**AFTER-PAIN FOLLOWING OPERATIONS UNDER LOCAL ANALGESIA.** A. Schlesinger, London, Deutsche Medizinische Wochenschrift, April 16, 1914.

**AFTER-PAIN WITH LOCAL ANALGESIA.** F. Honigmann, Zentralblatt für Chirurgie, Leipsic, February 7, 1914.

**ALYPIN, TOXIC LIMIT OF.** L. Lichtenstein, Therapie der Gegenwart, Berlin, February, 1914.

**ANESTHESIA.** L. Frank, Louisville, Kentucky State Medical Journal, March 15, 1914.

**ANESTHETICS, ANESTHESIA AND THE ANESTHETIST.** G. T. McCauliff, Webster City, Iowa State Medical Society Journal, February, 1914.

**ANESTHETICS.** W. N. Lynn, Knoxville, Tennessee State Medical Association Journal, February, 1914.

**ANESTHETISTS, DUTIES OF.** E. F. Horine, Louisville, Kentucky Medical Journal, May 15, 1914.

**ANESTHETIST, DIFFICULTIES WITH WHICH HE HAS TO CONTEND.** R. W. Hornabrook, Practitioner, London, June, 1914.

**ANESTHETIC AGENTS, OUR GENERAL, ETHER AND NITROUS OXID.** W. C. Woolsey, Brooklyn, Long Island Medical Journal, February, 1914.

**ANESTHETIST, STANDARD EDUCATIONAL QUALIFICATIONS FOR THE.** R. C. Coburn, New York, Medical Record, February 21, 1914.

**Anesthetics and Diagnosis.** J. BLUMFELD, *Lancet*, March 28.

In a lecture delivered at the Medical Graduates' College and Polyclinic, Blumfeld lays stress on the fact that the administration of an anesthetic may be the chief step in making a correct diagnosis, not merely by allowing of an examination which was previously impossible without it, but also by providing fresh symptoms through the observed behavior of the patient during anesthesia. On one occasion, Blumfeld saw respiratory trouble arising during anesthesia, led to the detection of a mediastinal tumor, which had caused no symptoms in the conscious patient.

An examination with the abdominal wall thoroughly relaxed and just previous to operation, will often enable the surgeon to modify his preliminary diagnosis as to the organ affected or the location of tumor masses. It is inconvenient to make a gridiron incision for appendectomy and find a carcinoma of the sigmoid that can be removed only through another incision.

Again, it is frequently possible under an anesthetic to make out secondary deposits that preclude a successful operative interference, and also to differentiate carcinoma of the transverse colon from an enlarged gall-bladder.

While phantom tumors may enlarge during the excitement stage of anesthesia, they slowly melt away under the examining hand, when a plane of surgical narcosis has been reached.

Blumfeld draws attention to this unique point of differential diagnostic significance, that under anesthesia, particularly in chronic cases coming to operation, the pathological seat of trouble will be found under that part of the abdominal wall where rigidity persists. Thus he has seen duodenal ulcer differentiated from appendicitis, and the correct incision made after an examination under deep narcosis, during which the upper portion of the rectus muscle remained rigid in spite of the anesthetic. He suggests that in such instances portions of the muscle may undergo fibrotic changes as a protective action on the part of nature.

He quotes a personal observation in which under an anesthetic a gynecologist changed his diagnosis from an ovarian cyst complicating pregnancy, to a cyst complicating a fibroid tumor, the cyst, remarkable to say, having been considered the pregnant uterus.

Respiratory trouble under anesthesia in another gynecological case led to the discovery of a band attached to the cervix, which made traction upon a certain portion of the cul-de-sac and caused considerable pain to the conscious patient.

Blumfeld also reiterates the importance of examinations under an anesthetic in hemorrhage from the vagina or rectum in order to rule out carcinoma.

**ANESTHETIC TENSION OF ETHER VAPOR IN MAN, DETERMINATION OF.** Mode of Action of Common Volatile Anesthetics. W. M. Boothby, Boston, Journal of Pharmacology and Experimental Therapeutics, March, 1914.

**ANESTHETIZATION.—ANESTHETIZER AND SURGEON.** R. L. Charles, Denver, Colorado Medicine, June, 1914.

**ANOCI-ASSOCIATION.** (Weitere Erfahrungen mit Kombinierten Narkosen). P. Sick, Deutsche Zeitschrift für Chirurgie, cxxviii, Nos. 3-4.

**ANOCI-ASSOCIATION, TECHNIC AND RESULTS OF.** H. G. Sloan, Cleveland, Lancet-Clinic, January 3, 1914.

**ANOCI-ASSOCIATION AND CANCER OF THE CHEEK.** E. W. C. Bradfield, Indian Medical Gazette, April, 1914.

**ANOCI-ASSOCIATION—PREVENTION OF SHOCK AND POST-OPERATIVE PAIN.** A. B. Cooke, Los Angeles, Journal American Medical Association, June 6, 1914.

**ANOCITHESIA—PAINLESS SURGERY.** C. A. L. Reed, Cincinnati, Medical Record, March 7, 1914.



**Anoci-Association in Its Relation to Operations on the Biliary Tract and Stomach.** (Illustrated.) GEORGE W. CRILE, Cleveland. *The Ohio State Medical Journal*, July, 1914.

Impairment of liver function due to pathological states of the stomach or biliary passages, which require operation under an anesthetic, may result in a metabolic quicksand, indicated by increasing apathy, somnolence progressing to unconsciousness and death of the patient. From exhaustive laboratory experiments Crile has concluded that the brain, adrenals and liver are mutually dependent upon each other in the conversion of latent into kinetic energy. The functional activity of the liver depends on a simultaneous hormone action and sympathetic nerve stimulation. Operative trauma readily blocks this sympathetic nerve stimulation, resulting in temporary loss of liver function, and jeopardizing the patient's post-operative recovery.

In handling these hazardous risks anoci-association enables the operator to preserve and perchance widen the slender margin of safety. Preoperative medication should be used to minimize or prevent emotional excitement. Nitrous oxid-oxygen should be the anesthetic of choice, since it does not impair immunity, as does ether.

Regional analgesia with novocain should precede every division of nerve-bearing tissue; manipulative trauma should be minimized and sharp, bloodless dissection used; post-operative pain should be controlled by quinine and urea hydrochlorid injected at a distance from the line of incision, but including the entire area of operation; the sick-room environment should be made cheerful and hopeful, and narcotics should be used to control post-operative pain and undue psychic strain.

Laboratory experiments backed by clinical results have convinced Crile that deep morphinization will measurably protect the brain, the suprarenals and the liver against operative trauma and against infection. Morphia given, not in one dose, but in repeated doses, will conserve the functional activity of the vital organs and prevent the supervention of a destructive metabolic process that will jeopardize the life of a hazardous risk.

**Anoci-Association: The Needlessness of Combined General and Local Anesthesia as Shown in the Results of the Last 1,000 Cases Admitted to the Gynecological Department of the Howard Hospital.** BARTON COOKE HIRST, Philadelphia. *American Journal of Obstetrics*, April, 1914.

Hirst raises the question of the accuracy of hospital statistics in reference to Crile's reported mortality of 0.8 per cent in 1000 cases under anoci-association. Comparing his own statistics in the last 1000 cases operated on in the Gynecological Department of Howard Hospital, he finds a mortality of 1.5 per cent, or fifteen deaths. Excluding one other death on the table before operation was begun, an unfortunate occurrence to two of the resident physicians, the other fatalities were due to advanced cancer, tuberculosis or sepsis, and excluding the hopeless risks, the mortality would be reduced to 0.6.

This fact questions the advisability of combined general and local anesthesia as a routine procedure, particularly when the factors of the loss of vitality due to the prolonged operative time and the incidence of suppurating wounds are considered.

**APPARATUS, PORTABLE NITROUS OXID-OXYGEN.** S. W. Moorhead, Philadelphia. *Journal American Medical Association*, April 25, 1914.

**APPARATUS FOR USE IN OPERATIONS ON THE OPEN THORAX.** C. A. Ewald, Seattle. *Boston Medical and Surgical Journal*, April 9, 1914.

**APPARATUS, NITROUS OXID-OXYGEN-ETHER, PREVIOUSLY UNEMPHASIZED FEATURE IN THE CONSTRUCTION OF.** P. J. Flagg, New York City. *Journal American Medical Association*, January 3, 1914.

**APPARATUS FOR INTRATRACHEAL INSUFFLATION.** J. P. Pratt, Baltimore. *Journal American Medical Association*, January 3, 1914.

**APPARATUS—IMPROVED FACE MASK.** W. L. and C. P. Brown, El Paso. *Journal American Medical Association*, April 25, 1914.

**APPARATUS, SIMPLE AND COMPLETE FORMS OF, FOR INTRATRACHEAL ANESTHESIA.** H. H. Janeway, New York. *Annals of Surgery*, April, 1914.

**Apparatus—Ether Vaporizer, an Inexpensive and Simple.** PAUL B. COBLE, Indianapolis. *Journal Indiana State Medical Association*, March 15, 1914.

In his apparatus Coble obviates the administration of moist ether vapor, and the danger of forcing liquid ether into the mouth or naso-pharynx, by surrounding his ether generator and the separate vapor chamber with water jackets, instead of passing the vapor through the hot water itself.

In order to obtain the desired results from etherization by the vapor method it is necessary to watch a few details. The metal tubing on the mouth-gag, mouth piece or mask, must be of sufficient caliber to permit a ready flow. The anesthetist must use a continuous flow of vapor, and not try to give it merely during inspiration. In tonsil and adenoid work particularly about one-half of the vapor is lost, being blown away by expiration. Covering the mouth or occluding the nares for a few inspirations will deepen narcosis as desired.

**AURAL SURGERY, ANESTHESIA IN.** W. G. Doran, New York. *Laryngoscope*, June, 1914.

**BLOCKING THE INFERIOR MAXILLARY NERVE AT THE FORAMEN OVALE.** F. Bonola, Policlinico, April, 1914.

**BLOCKING THE SYMPATHETIC TO PREVENT SHOCK IN COMBINED OPERATIONS FOR CANCER OF THE RECTUM OR RECTO-SIGMOIDAL JUNCTURE.** Jerome M. Lynch, New York. *American Journal of Obstetrics*, February, 1914.

**BLOOD-PRESSURE, VARIABILITY OF AND VASOMOTOR IRRITABILITY OF ANESTHETIZED DOG.** R. S. Hoskins and H. Wheelon, Chicago. *American Journal of Physiology*, April, 1914.

**BLOOD - PRESSURE, COMPARISON OF ACTION OF CHLOROFORM AND ETHER ON.** H. P. Fairlie, London. *Lancet*, February 21, 1914.

**BUBO OPERATIONS, LOCAL ANESTHESIA IN.** S. Honna and M. Kitagawa, Tokyo. *Sei-I-Kwai Medical Journal*, June 6, 1914.

**BRACHIAL PLEXUS ANALGESIA AND ITS COMPLICATIONS.** F. Hartel and W. Keppler. *Archives fur Klinische Chirurgie*, ciii, No. 1.

**BRACHIAL PLEXUS—SUPRACLAVICULAR ANESTHETIZATION OF; CASE OF COLLAPSE FOLLOWING ITS ADMINISTRATION.** H. Neuhoof, New York. *Journal American Medical Association*, May 23, 1914.

**Brachial Plexus Anesthesia: Complete Local Analgesia, Permitting of all Major Operations on the Upper Extremity.** A. STRACHAUER, *Minneapolis Journal-Lancet*, June 1.

Strachauer prefers the technic of Kulenkampff, who in 1911 successfully induced brachial plexus analgesia on his own body. The patient is seated with the head turned away from the side to be injected. In favorable cases the plexus can be palpated in the inferior cervical triangle as it crosses the first rib. The needle is introduced above the middle of the clavicle, external to the pulsation of the subclavian artery, and is pushed inward and downward toward the spinous process of the third dorsal vertebra. The needle should be 6 cm. long. Parasthetic sensations in the hand and arm indicate that the plexus has been reached. Twenty cc. of a 2 per cent. solution of novocain and suparenin, in isotonic saline at body temperature, are injected. Parasthesia increases momentarily and then analgesia supervenes in from three to ten minutes, and lasts for one to two hours. The analgesia is sufficiently complete for any major operation on the upper extremity, except that in shoulder operations additional subdermal blocking of the cutaneous nerves is necessary.

Brachial plexus anesthesia is an ideal method for the reduction of old dislocations and fractures on account of the perfect relaxation obtained.

- CALLIBRATION OF WALLER GAS BALANCE AND CONNELL ANESTHETOMETER.** W. M. Boothby and I. Sanford, Boston, *Journal of Pharmacology and Experimental Therapeutics*, March, 1914.
- CELL-DIVISION, ACTION OF ANESTHETICS IN SUPPRESSING.** R. S. Lillie, Woods Hole, Mass., *Journal of Biological Chemistry*, March, 1914.
- CHLOROFORM ANESTHESIA IN THE LIGHT OF PHYSIOLOGICAL RESEARCH.** G. H. Clark, *Glasgow Medical Journal*, January, 1914.
- CHLOROFORM TOXICITY AND HEPATIC NECROSIS, INFLUENCE OF DIET ON.** E. I. Opie and L. B. Alford, St. Louis, *Journal American Medical Association*, March 21, 1914.
- COUNTRY PRACTITIONER, ANESTHESIA FROM THE STAND-POINT OF.** J. F. Auner, Waverly, Iowa, *State Medical Society Journal*, June, 1914.

**Cocaine, Dosage of, and Other Drugs Used For Local Analgesia.** A. H. MILLER, Providence, R. I., *The Journal of the American Medical Association*, January 17.

Miller reported 103 cases to the Providence, R. I., Society of Anesthetists, in which alypin had been used as a local analgesic. Of these, thirty-five were minor surgical operations and sixty-eight genito-urinary. In one hundred of the cases analgesia was perfectly satisfactory, in two the analgesic caused serious difficulty and in one instance death. In the last case the patient was an apparently healthy adult, thirty-nine years of age, who was about to undergo dilatation for stricture of the urethra. About two drachms of a 10 per cent. solution of alypin were introduced into the urethra and bladder. Two minutes later he had a general convulsion. A half-dozen similar convulsions occurred during the next ten minutes, with cessation of respiration and stopping of the pulse. Artificial respiration and stimulation were tried without avail.

In another instance an adult was about to have sounds passed for retention of urine. An unmeasured quantity of a 10 per cent. solution of alypin was introduced into the urethra. In about five minutes the patient had a general convulsion, respiration ceased and the pulse became imperceptible. The patient was revived after about two hours' work. In the third untoward case about one and a half drachms of a 10 per cent. solution of alypin was introduced into the urethra and bladder for dilatation of a stricture. In three minutes the patient became unconscious, and respiration became embarrassed, but the pulse remained good. Artificial respiration and inhalations of oxygen brought this patient around in about ten minutes.

These experiences emphasize the necessity for great care in the dosage of local analgesics. High percentage solutions are always dangerous. A fact that urologists overlook is the extremely rapid absorption of local analgesic drugs from the urethra and bladder into the general circulation. Those interested should try a liberal dose of adrenalin or eserine per urethra to note this peculiar rapidity of absorption and the disastrous systemic effects of potent drugs thus administered.

With regard to alypin, Bremmermann's technic of depositing a tablet of the drug at the point of analgesic localization is far preferable to throwing an unmeasured quantity of the 10 per cent. solution into the urethra or bladder.

- DEATHS AND FATALITIES, SECONDARY ANESTHETIC.** George Keil, *Deutsche Medizinische Wochenschrift*, May 14, 1914.
- (DEATHS) SURGICAL MORTALITY FROM STANDPOINT OF THE ANESTHETIST.** H. W. Kearney, Washington, D. C. *Washington Medical Annals*, May, 1914.
- (DEATHS) ANESTHETIC FATALITIES AND INJURIES, MEANS OF LESSENING.** R. F. Patterson, Nashville, Tennessee, *State Medical Association Journal*, February, 1914.
- DEATH DURING ETHER ANESTHESIA, STATUS LYMPHATICUS.** W. B. Howell, Montreal, Canada, *Journal American Medical Association*, March 28, 1914.

**Deaths During Anesthesia, a Review of Inquests Concerning.** R. FLEMMING, London, *Proceedings of the Royal Society of Medicine*, Section of Anesthetics, vol. vii, 1914.

Flemming has collected data regarding all instances of death under anesthesia reported in the English press from 1910-1913. The statistics are therefore far from complete. Of 700 cases recorded, the nature of the anesthetic used was ascertained in 542; in 521 of which the anesthetic seemed to have been more or less responsible in the causation of death. In 223 cases death is reported to have occurred before operation was begun. In at least 100 cases the severity of the operative interference was a factor in the consequent fatality.

Deaths from certain anesthetics occurred as follows: Chloroform, 378; Ether, 28; Mixtures, 100; Nitrous Oxide, 12; Ethyl Chloride, 6; Spinal, 8; Scopolamine, 2; Hedonal, 2; Local, 6; not specified, 158.

Among 338 persons the age ranged between twenty-six and sixty; in the remaining 124 it varied between six and fifteen.

Perhaps the only tenable conclusion that can be drawn from Flemming's data is the fact that chloroform is extremely fatal during the induction period of narcosis. The recent popularity of the drop method of etherization in England and on the Continent may soon modify statistics so that further deductions may be drawn.

#### Erroneous Deductions From Tracheal Insufflation.

RAYMOND C. COBURN, New York City, *New York Medical Journal*, June 20, 1914.

Coburn contends that less shock follows operations performed under insufflated ether, not because the latter protects better against shock than inhaled ether, but because tracheal insufflation relieves the extra burden thrown upon respiration, thereby conserving vitality. Crile's researches show that while neither ether nor nitrous oxide cause shock per se, still in the presence of trauma, brain cell exhaustion under ether is three times that which occurs under nitrous oxide anesthesia in the normal subject, and the proportion is greater in handicapped risks. Also ether by inhalation technics directly devitalizes the patient through respiratory restriction, and by the dissolving of the lipid in the cells of the blood, thereby embarrassing the eliminating and disintoxicating organs—the liver, kidneys, spleen, thyroid and adrenals.

Clinical experiences at Johns Hopkins prove conclusively that warm anesthetic vapor tends to conserve both the life and vitality of patients.

While indicators may be a guide in adjusting the apparent oxygen percentage in any given technic of administration, the proper degree of oxygenation and proper depth of anesthesia are the real factors that control the percentage adjustment.

Tracheal insufflation with increased pulmonary aeration without shock has led many observers to argue that acapnia is not a cause of shock.

While the increased intrapulmonary pressure of tracheal insufflation increases the alveolar oxygen tension, thereby facilitating oxygenation, the alveolar carbon dioxide tension is unaffected, as its percentage varies inversely with this pressure, and is not decreased unless there is an increase of alveolar ventilation. Intratracheal insufflation really produces a hypercapnia, necessitating, according to Meltzer's technic periodic interruptions, to partially deflate the lungs and thus increase alveolar ventilation, thereby removing the excess of accumulated carbon dioxide.

**ETHER ANESTHESIA.** W. C. Huyser, Kalamazoo, Michigan State Society Journal, June, 1914.

**ETHER ANESTHESIA BY THE OPEN METHOD.** F. R. Wid-dowson, Philadelphia, New Jersey State Medical Society Journal, May, 1914.

**ETHER INHALATION, EFFECT OF ON SKELETAL MOTOR MECHANISM.** S. J. Meltzer and J. Auer, *Journal of Pharmacology and Experimental Therapeutics*, May, 1914.

**EYE AND FACE OPERATIONS UNDER REGIONAL ANESTHESIA.** R. and M. Danis, Brussels. *Ophthalmology*, January, 1914.

- (EYE) LOCAL ANALGESIA TO COMBAT PHOTOPHOBIA COMPLICATING CONJUNCTIVITIS ECZEMATOSA. H. Peterka, *Munchener Medizinische Wochenschrift*, June 2, 1914.
- FRACTURES OF THE LOWER EXTREMITY, REGIONAL ANALGESIA FOR. (Regionäre Anästhesierung bei Frakturen der unteren Extremität.) P. Babitzki, *Deutsche Medizinische Wochenschrift*, February 12, 1914.

**Hemorrhoids, Their Radical Treatment Under Local Analgesia.** E. H. TERRELL, Richmond, Va. *Virginia Medical Semi-Monthly*, April 24, 1914.

Terrell was led to use the ambulant radical treatment of hemorrhoids under local analgesia because so many patients refused to submit to a general anesthetic and as many more could not jeopardize their employment by going to a hospital for the classical operation. While the methods has its limitations, its applicability is especially demonstrated in those long-standing cases of hemorrhoids, which protrude easily and have to be frequently replaced.

When the sphincters are irritable or the parts acutely inflamed, preliminary treatment is necessary before removal is attempted. If, however, the sphincter cannot be sufficiently dilated without excessive pain, Terrell uses the electric vibrator to overcome the spasm, and finds this technic of dilatation practically painless.

All ambulatory cases are operated in the office, preferably on Saturday, so that they may enjoy a Sunday's rest before returning to work, although this is not essential. When ready to operate the largest, accessible pile is first selected. This is brought down, cleansed with a mild antiseptic solution, and infiltrated with a solution containing one per cent quinine and urea hydrochloride, and about 1-10 per cent novocain. A clamp is then applied and ligatures placed in two or more sections, depending on the size of the pile. Fine linen is used for this purpose. The superior ligature is the most important as it controls the main blood supply. With a pair of sharp, curved scissors the pile is cut off close to the ligatures, leaving only sufficient tissue to prevent slipping. If there is no undue bleeding the stump is returned above the sphincters.

The patient should lie down for a while before going home or resuming the day's occupation. Patients treated in this way seldom complain of pain, although occasionally there is a slight throbbing sensation for a few hours. The prolonged obtunding effect of the quinine and urea is enough to keep the patient comfortable.

The procedure is repeated at intervals of from five days to a week until the radical cure is accomplished.

Two points in technic are emphasized: (a) no cutaneous tissue should ever be included in the ligatures; and (b) Hilton's white line is the most sensitive and irritable portion of the anal canal, and therefore must be deeply anesthetized and carefully manipulated to avoid trauma.

**HERNIA, LOCAL ANESTHESIA WITH SPECIAL REFERENCE TO.** C. W. Allen, New Orleans. *Texas State Journal of Medicine*, March, 1914.

**High Pressure Analgesia.** W. T. JACKMAN, Cleveland. *The Dental Summary*, May, 1914.

Jackman considers high pressure analgesia the preferable method for completely obtunding the tooth for painless preparation of the sensitive cavity. His technic is as follows:

The gums in the immediate region of the prospective operation should be desensitized with an aqueous 5 per cent solution of cocain, applied on a cotton swab with considerable pressure, after which the rubber dam is adjusted. With a No. 3 round bur, a pit not over one-third the depth of the enamel is made over healthy dentin, on either side of the buccal cavity, or preferably below it, if possible. This pit is slightly deepened with a No. ½ round bur without perforating the enamel. This preliminary drilling at low speed is painless. A Myers syringe with forceps handles and locking device is filled with a 2 per cent aqueous solution of cocain. Grasping the handles, dagger-fashion, the operator stands behind and to the right of the patient, passing the left arm around the patient's head, and placing the second, third and fourth fingers of the left hand under the patient's mandible near

the chin, with the index finger against the tooth to be operated on, for counter-pressure.

Having passed the syringe through the flame of the alcohol lamp, the needle is placed in the previously prepared pit, pressing slightly, and the handles are then closed. The rapidity with which the tooth will be obtunded will be in proportion as the contact is relatively perfect.

Having obtained perfect contact, an application of thirty seconds is usually required to force the solution through the remaining portion of the enamel and into the dentin, which may now be entered with a No. ½ bur without pain. Pressure is continued for ninety seconds longer to sufficiently obtund the remaining pulp. If sensation persists use the pressure for a few seconds longer.

Five years' clinical test of the method has convinced Jackman that high pressure analgesia with a 2 per cent solution does not act destructively on the pulp tissue. In fact, the analgesia prevents necrosis due to shock and the trauma of malleting, although it can in no way influence the injurious effects of excessive heat by rapid boring.

For the removal of the pulp, its condition is always a factor in determining the length of time high pressure analgesia should be used, two to two and a half minutes being the routine duration. If congestion has reached the stage of stasis, no method of analgesia will obtund the pulp. The presence of curly dentin contraindicates the method as it is ineffective in this condition, just as it is dangerous in the preparation of carious cavities, in which case ptomaines may be forced into the pulp, resulting in its ultimate destruction.

**HOSPITAL ANESTHESIA, RECENT METHODS IN.** C. N. Chipman, Washington, D. C. *Kentucky State Medical Journal*, June 1, 1914.

**Hysterical Monoplegia Following Electric Shock Cured Under Anesthesia.** P. STEWART, *British Medical Journal*, March 7.

This remarkable cure occurred in a young adult who had suffered an hysterical monoplegia following electric shock, after all other methods of therapy had been tried without success. Six months after the time of the accident the patient was anesthetized, and the excitement stage of etherization was unduly prolonged, and during this period the functional activity of the arm involved was restored.

**INTRAVENOUS ANESTHESIA.** C. L. Candler, Detroit. *Michigan State Medical Society Journal*, June, 1914.

**INTRAVENOUS ANESTHESIA WITH HEDONAL, EXPERIMENTAL RESEARCHES ON.** N. Berensgowsky, *Archiv für Klinische Chirurgie*, cii, No. 1.

**INTRATRACHEAL ANESTHESIA, MODIFIED TECHNIC FOR.** E. Jeger, *Deutsche Medizinische Wochenschrift*, January 29, 1914.

**INTRATRACHEAL ANESTHESIA.** S. Pope, San Francisco, California. *State Journal of Medicine*, March, 1914.

**Intratracheal Insufflation, Proper Depth of the Tube in.** S. J. MELTZER, Rockefeller Institute. *The Journal of the American Medical Association*, May 16.

In first describing the procedure of intratracheal insufflation for anesthesia during intrathoracic surgery, Metzler advocated the introduction of the tube until it met an obstruction and then suggested its withdrawal about an inch, which would bring it to the level of the bifurcation. The obstruction thus encountered was the lumen of the bronchus, not the bronchial partition at the bifurcation. This fact is of diagnostic significance. Some surgeons and anesthetists as a routine practice have simply accustomed themselves to introducing the tube to a depth of 27 cm. This practice may lead to error. Neither the cough reflex, nor the rhythmic expiratory and inspiratory changes of air pressure at the mouth of the catheter are absolute indications that the tube is in the trachea. A similar reflex and respiratory phenomena occurs also with the tube inadvertently introduced into the esophagus. Metzler has witnessed two instances of this kind, in which there was no air distention of the stomach, and in which the escape of the ether-laden air upward resulted in a pharyngeal form of anesthesia.

The fact that anesthesia may be maintained with the tube in the esophagus emphasizes the necessity for avoiding this contretemps, as the aspiration of blood and mucus would be facilitated instead of prevented, as it is in the proper technic.

A reliable evidence that the catheter is in the trachea is the encountering of an undoubted resistance while pushing the catheter downward. If the catheter can be pushed beyond a depth exceeding 33 cm. it has been introduced into the esophagus.

To obviate this mistake Mettler suggests that the catheter be marked at two points, 27 cm. and 35 cm., respectively; that the tube be introduced until it meets an obstruction at or near the 35 cm. mark, and then be withdrawn to the 27 cm. mark, and that the routine practice of introducing the tube only to a place above the tracheal bifurcation, without differentiating its real situation, be discontinued.

In conclusion Mettler points out the disadvantages of the catheter with lateral openings as against the increased efficiency of the tube with the opening at the end.

**ISOPRAL RECTAL ANESTHESIA, DANGERS OF.** P. Kleinschmidt, *Berliner Klinische Wochenschrift*, February 2, 1914.

**KIDNEYS, ACTION OF SPINAL ANESTHESIA ON.** R. Mosti, *Gazetta degli Ospedali e delle Kliniche*, Milan, xxxv, Nos. 30-33.

**Larynx, A Method of Anesthetizing.** COURTENAY YORKE, Liverpool, *British Medical Journal*, June 13, 1914.

Anesthesia of the larynx by novocain injections around the internal laryngeal nerves is of value when cocaine alone will not induce complete anesthesia, as in inflammatory and highly irritable conditions of the larynx; when deep anesthesia is required for actual cauterization, and when the patient is unduly sensitive to the toxic properties of cocaine.

The method was originally proposed by Frey in 1906, and Yorke has used a modified technic in 55 cases, including 9 with new growths of the larynx, 2 with singer's nodes, 2 with lupus, and the remainder with tuberculous laryngitis requiring the use of the actual cautery.

A preliminary hypodermic injection of morphine and atropine is advisable, and the palate, fauces, pharynx and base of the tongue are desensitized by the usual application of cocaine. A hypersensitive palate requires novocain injections in the neighborhood of the posterior palatine foramina, and the recalcitrant epiglottis and base of the tongue may be controlled by injections just above the hyoid.

Post-mortem dissections have convinced Yorke that previous methods are uncertain for anatomical reasons. Thrusting the needle in at right angles to the surface in an effort to reach the internal laryngeal nerve as it lies on the thyro-hyoid membrane just before piercing that structure, makes it difficult to locate the plane of the nerve, and places the great vessels in danger of puncture.

Yorke directs the needle along the course of the nerve from the point where it pierces the thyro-hyoid membrane to a point half an inch below the upper border of the thyroid cartilage. The solution is injected during the progress of the needle, and in this technic one inch or more of the nerve in a position easily accessible, is brought under the effect of the novocain.

To get the needle into the plane of the nerve it is entered so as to strike the great cornu of the hyoid one inch behind the lesser cornu; the point is slightly depressed until it hitches against the lower border of the great cornu, where it is in relation with the uncovered area of the thyro-hyoid membrane, and in a position to commence the downward and forward movement along the nerve.

There is very little likelihood of the needle entering the pharynx, until it sinks beneath the upper border of the thyroid, in which location it is important to keep in front of the sinus pyriformis. In the male, Yorke has found that the sinus pyriformis is one to one and a quarter, and in the female three-quarters to an inch from the middle line of the neck.

During the injection the patient lies in the recumbent position with the neck well extended to open up the thyro-hyoid interval. A strong, sharply pointed needle, two and

a half inches long, is employed, and the fluid used is a 5 per cent aqueous solution of novocain, to which a small quantity of adrenal is added. Twenty to thirty m. of this solution are injected into both sides. Quinine and urea hydrochloride similarly used has proved disappointing.

In the 55 cases thus anesthetized there was no hemorrhage or inflammatory reaction. The large vessels, if pressed back with the thumb are quite out of danger, and with aseptic precautions the risk of infection is insignificant.

**LEGAL STATUS OF TRAINED NURSES IN ADMINISTRATION OF ANESTHETICS.** A. C. Vandiver, *New York Medical Journal*, May 30, 1914.

**LOCAL ANESTHETICS IN SURGICAL PRACTICE.** D. Pellegrino, Rome, *Poliniclinico*, February 15, 1914.

**LOCAL ANESTHESIA.** R. Duffy, Plant City, Fla. *Georgia Medical Association Journal*, May, 1914.

**Magnesium Narcosis, Investigation of.** (*Untersuchungen über die Magnesiumnarkose.*) E. STARKENSTEIN, *Centralblatt für Physiologie*, XXVIII, 1914.

Since the initial laboratory and clinical researches of Mettler and Auer on anesthesia following the injection of magnesium salts, it has been a disputed point whether the phenomena observed was a true narcosis of central origin or a profound paralysis involving the peripheral nervous system. Combined in doses insufficient of themselves to induce anesthesia, Mettler and Auer found that magnesium and ether would produce narcosis without any evidence of peripheral paralysis. More recently Starkenstein has found that the irritability of the entire nervous system is depressed by magnesium ions. This is in line with the latest observations of Mettler and Auer that the decreased capacity of the skeletal motor mechanism to produce tetanus under ether anesthesia is in reality an increase of fatigability, more noticeable in nerve stimulation than in direct stimulation of the musculature, thereby indicating a curare-like action. Further investigation of Githens and Mettler have shown that the toxic action on the peripheral respiratory mechanism begins in the earlier stages of etherization, and that the phrenic nerve and the diaphragm lose a great deal of their irritability in the course of prolonged ether narcosis.

Primarily chloroform does not produce this same effect. The irritability of motor nerves to faradic stimulation persists, independently of the length of narcosis, under chloroform, unless the heart becomes profoundly affected from an overdosage or secondary complications such as anemia or asphyxia are present.

**MENTAL AND INFRA-ORBITAL NERVES, BLOCKING OF, AT THEIR FORAMINA TO INDUCE OPERATIVE ANALGESIA IN THEIR CUTANEOUS DISTRIBUTION.** P. G. Skillern, Jr., Philadelphia. *Surgery, Gynecology and Obstetrics*, March, 1914.

**MOTOR NERVES, IRRITABILITY OF UNDER CHLOROFORM ANESTHESIA.** T. S. Githens and S. J. Mettler, *Journal of Pharmacology and Experimental Therapeutics*, May, 1914.

**NITROUS OXID-OXYGEN NOVOCAIN ANESTHESIA.** W. E. Bannen, La Crosse, *Wisconsin Medical Journal*, May, 1914.

**NITROUS OXID ANESTHESIA.** H. M. Decker, Davenport, Iowa, *Ibid.*

**NITROUS OXID-OXYGEN ANESTHESIA.** A. H. Miller, Providence, R. I. *New York Medical Journal*, January 24, 1914.

**Nitrous Oxid-Oxygen Analgesia.** MOSES SALZER, Cincinnati, O. *The Dental Summary*, June, 1914.

Salzer points out the futility of attempting analgesia with nitrous oxid-oxygen alone in patients who are excessively nervous and do not want to be conscious of what is going on. Until they have been educated to the efficiency of gas-oxygen analgesia by several experiences, they should receive some preliminary medication as morphin, hyoscin or bromides.

In all cases in which pain, caused by the dental manipulation itself, is responsible for the patient's dread or nervousness, gas-oxygen analgesia is marvelously efficient.

Salzer is doubtful of the ability of the average dentist to operate and maintain analgesia at the same time, without an assistant, even when using the various automatic apparatuses on the market. Unless the assistant is an expert anesthetist or the dentist himself is unusually skillful, the analgesia is apt to be irregular, and may lapse into anesthesia, in which unpleasant dreams may supervene, the memory of which may remain, causing a lasting shock to the nervous system, or may be misinterpreted, thus seriously compromising the operator.

The amount of nitrous oxid and oxygen necessary for satisfactory analgesia must be gauged wholly and solely by the patient's sensation, and inasmuch as the sense of hearing is the last of the special senses to be obtunded, short of anesthesia, answers to questions may be utilized as an indication of the depth of analgesia. Reflexes of spinal origin are entirely independent of the perception of pain and may occur under deep nitrous oxid-oxygen anesthesia. While they may inconvenience the operator they are no indication that the analgesia is not satisfactory.

Salzer concludes his article by recounting the personal experiences of a psychologist and a physician under analgesia for dental operations.

The psychologist found that he could readily control the depth of analgesia by deepening his breathing of the gases, and he was highly amused by the thought that it would be quite a joke on the doctors if he reached a point where he could not respond to their instructions to indicate sensations of pain by raising his hand, but could nevertheless still feel the pain.

The physician also found that he could control the depth of analgesia by deepening his breathing, and he was particularly impressed by the clear line of demarkation that separated the realization of outside impressions, such as surroundings and pain, from reasoning ability. Throughout the entire analgesia he was able to reason clearly and make mental note of his sensations to report them to the anesthetist. Confusion was only noticeable when the gases were discontinued and all the mental processes re-established themselves with "confusing rapidity."

**NON-MEDICAL ANESTHETISTS.** Lawrence Irwell, Buffalo, New York. *State Journal of Medicine*, March, 1914.

**NOSE AND THROAT SURGERY, QUININE AND UREA HYDROCHLORIDE IN.** A. J. Herzig, New York Medical Journal, March 14, 1914.

**NOVOCAIN AS A LOCAL ANALGESIC (Mayo Clinic).** D. C. Balfour, St. Paul Medical Journal, February, 1914.

**OIL-ETHER ANESTHESIA.** James T. Gwathmey, New York. *New York Medical Journal*, January 31, 1914. *Technic of*, *Ibid*, March 21, 1914.

**OIL-ETHER ANESTHESIA.** J. C. Plate, Valdosta, Georgia, *Medical Association Journal*, February, 1914.

**OIL-ETHER COLONIC ANESTHESIA.** W. W. Spargo, Albuquerque, *New Mexico Medical Journal*, July, 1914.

**OIL-ETHER COLONIC ANESTHESIA: 500 SUCCESSFUL ADMINISTRATIONS.** James T. Gwathmey, *American Journal of Surgery*, July, 1914.

**Oil-Ether Rectal Anesthesia: Some Theoretical Considerations.** H. CLIFTON LUKE, New York, *Medical Record*, May 9, 1914.

Gwathmey's revival of rectal or colonic anesthesia by the new oil-ether technic leads Luke to propound some theoretical considerations. Luke maintains that the method is not exact because the entire dosage is estimated and placed in the colon for absorption before the length of time of the operation is known, and while the patient's susceptibility to ether is problematical, the patient's age and the rapidity of absorption, particularly in the Trendelenburg posture, are also factors in inaccuracy, while the remnants of oil-ether left in the bowel after the post-operative enema may prolong recovery from the anesthetic.

That in its absorption the ether does not carry intestinal toxins into the circulation is as yet to be proven. Also the anesthetic, by this method, reaches the vital centers circuitously, as it first enters the venous blood and passes through the portal circulation before reaching the right heart and lungs. Furthermore the method predis-

poses to pulmonary depression and does not obviate aspiration, as does intratracheal insufflation, and opens the way to post-anesthetic pneumonias.

Clinically Luke objects to the method because of the exhaustion associated with the special rectal preparation required; the occasional necessity of proctoscopic examination as a matter of precaution; the occurrence of cramps during the induction period, which is frequently prolonged, and must often be aided by inhalation narcosis; the slow or abrupt onset of respiratory depression, followed by the arrest of breathing, loss of muscular tone, dilated pupils and the possibility of fatal syncope; the occurrence of proctitis or colitis post-operatively, delayed recovery, and increased toxemia.

**Pantopon-Scopolamine as an Adjunct to Local Analgesia in Ophthalmic Surgery.** A. MAITLAND RAMSAY, *Lancet*, April 25.

Ramsay reports very satisfactory results from the use of pantopon-scopolamine as an adjunct to local analgesia in routine ophthalmic operative procedures. Pantopon was introduced by Prof. Sahli, director of the Medical Clinic at Berne, and it contains all the alkaloids of opium as soluble hydrochlorides in the same proportions as in the crude drug. The average dose of the combination is 2-3 gr. pantopon and 1-150 gr. scopolamine.

Ramsay's attention was attracted to the combination by Gray's report of its efficacy as an adjunct to local analgesia. (*Lancet*, September 2, 1911.) While the use of cocaine or novocaine produces a perfect analgesia, the patient's mind is not at ease. He is alert and apprehensive, and in consequence has difficulty in keeping himself under control. The use of pantopon-scopolamine, however, acts as a sedative to the nervous system and thereby helps the surgeon to perform the operation in hand easily and satisfactorily. In administering the combination, Ramsay advocates the use of a full dose to adults one and a half hours previous to operation, and an additional half-dose if the first is not sufficiently effective. The patient should come to the table without any feeling of nervous dread. A 2 per cent aqueous solution of cocaine hydrochloride is used for instillation, and a 2 per cent solution of novocaine with 39 minims of adrenalin chloride (1:1,000) for injection.

Ramsay has used the combination as an adjuvant in the following operations upon the eye-ball and its appendages. Cataract, glaucoma, irido-sclerectomy in chronic glaucoma, plastic operations on the eyelids, extirpation of the lachrymal sac, and enucleation of the globe. The pantopon-scopolamine acted least satisfactorily in the extraction of cataracts, as there was a tendency, on account of the patient's drowsiness, for the eyeball to roll upward, thereby hindering the delivery of the lens.

Although the use of the combination in no way facilitated the actual operative procedure, the after-effects were all that could be desired. Patients usually went to sleep immediately on their return to bed and slept soundly without any marked effect upon either pulse or respiration.

**PARASACRAL ANALGESIA.** R. Tolken, *Deutsche Medizinische Wochenschrift*, January 22, 1914.

**PHIMOSIS OPERATIONS LOCAL ANALGESIA FOR.** M. Saissi, *Presse Medicale*, April 4, 1914.

**Prognosis in General Anesthesia.** V. A. STANGE. *Rus-sky Vrach* (St. Petersburg), January 18.

Stange considers the condition of the heart as the best indication of the patient's ability to withstand general anesthesia. To determine the condition of the cardiac muscle, Stange recommends the so-called respiratory test, that is, the ability to abstain from breathing for some time. Healthy persons can do this from thirty to forty seconds, while those with a weak heart muscle can hold their breath at most from ten to twenty seconds. The test is very simple. The patient, sitting at ease, takes a deep inspiration and closes his mouth, the nostrils being slightly compressed to avoid involuntary expiration; and while the patient is requested to abstain from breathing as long as possible, the seconds are counted. Stange in-

sists that if the breath cannot be held more than twenty seconds, the patient should be operated on under analgesia, or his systemic condition be first improved. He quotes some American insurance companies who do not consider any candidate a good risk who has a respiratory test below forty.

In this connection it is interesting to note that Yandell Henderson in the *Journal of the American Medical Association*, July 25, has a preliminary communication on "The time that Breath can be Held as an Index of Acidosis."

While Stange seems to have no suspicion that his test is based on an apnea due to acidosis, nevertheless he reports observations on a number of chronic diseases in which he finds the duration of voluntary apnea to be abbreviated in about the degree, in which acidosis is known, from the results of other observers, to occur. Lewis, Ryffel, Wolf, Cotton and Bancroft have recently shown that the dyspnea of nephritis is due to an acidosis essentially like that developed in normal persons at great altitudes. Keneway, Pembrey and Poulton have found that by following the alveolar carbon dioxide in diabetics, a warning drop in its tension indicates the approach of coma as long as forty-eight hours before hand and longer than any other method.

Thus voluntary apnea due to acidosis, diagnosed by this simple respiratory test, will serve as a warning to the anesthetist and operator in handling diabetic, cardiac and renal risks.

**PROSTATECTOMIES (17) UNDER EXCLUSIVE LOCAL ANALGESIA.** F. Legueu, Paris, *Journal d'Urologie*, June, 1914.

**Prostatectomy Under Local Anesthesia.** C. W. ALLEN, New Orleans. *New Orleans Medical and Surgical Journal*, February, 1914.

The technic developed by Allen is as follows: One hour before operation a suppository containing 10 grains of anesthesin is placed in the rectum to anesthetize this region and prevent any discomfort when the finger is introduced to elevate the prostate. At the same time a hypodermic injection of morphia 1-6 grain and scopolamin 1-150 grain is administered to lessen psychical disturbances. The bladder is opened under local anesthesia and its walls retracted by long, deep retractors, bringing the field of the prostate into view. Points below the opening of the urethra, near the base of the gland on either side, are selected for injection on the vesical surface. The needle is passed through the mucosa with the idea of making the injection between the true and false sheath of the prostate, as it is in this plane that the solution must diffuse around the gland and the enucleation is effected. It is here that the large venous plexuses are situated and the nerve filaments are more easily reached as they pass through to the prostate.

Two or three drams of a ½ per cent novocain solution, containing 15 minims of adrenalin to the ounce, are injected at the points mentioned. The needle is then passed into the urethral opening and the lateral walls are similarly injected. An additional injection may be made at the point where very large glands project above the urethral opening. Analgesia is established within five minutes, during which period the adrenalin blanches the prostate. The solution does no harm if injected directly into the gland, but the analgesia is not as effective as when infiltration occurs peripherally between the true and false sheath of the prostate.

This technic blocks all shock from surgical trauma, controls hemorrhage and obviates the systemic complications of general anesthesia, hence its efficacy in reducing the already low mortality in prostatectomy, particularly in bad risks that have had the additional security of preliminary bladder drainage in the two-stage operation.

**RECTAL NEUROSES AND OFFICE OPERATIONS, LOCAL ANALGESIA IN.** J. D. Reeder, Maryland Medical Journal, February, 1914.

**RECTAL ANESTHESIA, DANGERS OF ISOPRAL FOR.** P. Kleinschmidt, Berliner Klinische Wochenschrift, February 2, 1914.

**RECTAL CASES UNDER LOCAL ANESTHESIA.** J. F. Saphir, New York Medical Journal, May 9, 1914.

**RESEARCH, ANESTHESIA IN SURGICAL.** B. F. McGrath, Rochester, Minn., Surgery, Gynecology and Obstetrics, June, 1914.

**RESPIRATION, NATURE OF THE CESSATION OF DURING DEEP ETHER ANESTHESIA.** T. S. Githens and S. J. Meltzer, *Journal of Pharmacology and Experimental Therapeutics*, May, 1914.

**Sacral and Local Anesthesia For Laparotomies.** M. TRAUGOTT, *Munchener Medizinische Wochenschrift*, May 12, 1914.

Traugott advocates the following preliminary medication: The evening before the operation the patient receives 0.5 gram of veronal; one and a half hours before the operation a combination of pantopon-scopolamine is injected subcutaneously, the dose being repeated one-half hour before operation, or during the operative procedure if the patient becomes restless.

The spinal injection is made with the patient in the knee-chest position. If bleeding occurs through the trocar, the needle is slightly withdrawn and the body of the patient elevated. Ten to twenty c.c. of salt solution are injected, followed by an equal amount of a 1 per cent novocain solution, the pulse and respiration being carefully observed.

The accidental injection of the novocain solution into a vein causes immediate acceleration of the pulse and respiration.

The technic was applied in a long series of laparotomies, including hysterectomies, appendicectomies, nephrectomies and ovariectomies, and in fifty per cent of the cases the sacral analgesia was completely satisfactory. In 38 per cent an additional volatile anesthetic had to be administered, and in 6 per cent the method had to be abandoned owing to pain and the failure of the musculature to relax.

**SACRAL ANESTHESIA: EPIDURAL INJECTIONS.** E. Zweifel, *Munchener Medizinische Wochenschrift*, March 31, 1914.

**SPINAL ANALGESIA.** J. M. Bartrina, *Presse Medicale*, January 3, 1914.

**SPINAL ANESTHESIA WITH NOVOCAIN.** S. Mercade, *Journal de Chirurgie*, January, 1914.

**SPINAL ANESTHESIA, EXPERIENCES WITH IN PELVIC SURGERY.** B. M. Anspach, Philadelphia, *American Journal of Obstetrics*, May, 1914.

**SPINAL ANALGESIA AND SHOCKLESS OPERATIONS.** J. Morley, *Medical Chronicle*, Manchester, January, 1914.

**Submucous Resection of the Nasal Septum, Satisfactory Local Analgesia For.** J. J. KING, New York City. *Journal American Medical Association*, May 30, 1914.

Following a preliminary dose of scopolamine, 1-150 gr., one-half hour previous to operation to allay nervousness and act as a therapeutic antagonist to cocaine, King, with a cotton-wool applicator, applies a 20 per cent solution of cocaine over every part of the mucous membrane of the septum, the application being immediately repeated. This is succeeded by a similar application of a 1:1,000 epinephrin solution. Then 8 to 10 c.cm. of sterile salt solution, to which 5 minims of a 1:1,000 epinephrin solution have been added, are injected under the septum perichondrium and periosteum on each side. This infiltrates every portion of the septum membrane, blocks off the nerves, prevents shock and renders the operation practically bloodless. It also aids in elevating the perichondrium from the cartilage, thereby facilitating dissection. King limits himself to 5 minims of the epinephrin solution, as this dose is well within the toxic limits of the drug, and is sufficient to render the operative field bloodless.

**TOXICATION, INCREASE OF ETHER, BY NEW METHOD OF ADMINISTRATION.** R. C. Coburn, New York, *Journal American Medical Association*, January 31, 1914.

**TONSILLECTOMY IN THE UPRIGHT POSITION UNDER ETHER.** W. H. Roberts, Pasadena, Cal., *Laryngoscope*, February, 1914.

**UROLOGY, REGIONAL AND LOCAL ANALGESIA IN.** G. Le-moine, *Journal d'Urologie*, May, 1914.



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## BONE TRANSPLANTATION WITH AUTOGENOUS SLIDING GRAFTS AND BONE NAILS.

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The operation herein described combines advantageous features of several operations together with a few original procedures. It seems to fulfill most satisfactorily the indications in certain types of ununited fracture, especially fracture of the tibia, and it does away completely with the necessity of cutting into both legs, thus reducing the danger of infection by almost one-half. It provides for adequate fixation of the transplant without the introduction of any metallic or other foreign body. The whole procedure is the evolution of an effort to do away with the insertion of all types of unabsorbable material, because of the necessity for its later removal in a large percentage of cases, and because it is apparently proven that, though efficient and sound in many clean cases, bone union in the presence of foreign material is usually delayed. Further, the operation finds its greatest usefulness in cases where union by plate or wire has signally failed. The sliding transplant has also been used in recent cases with most satisfactory results.

The method is a direct result of a study of the case shown in figures 1 and 2. The man had a badly comminuted fracture of the lower third of the tibia with a simple fracture of the upper third of the fibula (Fig. 1). Immediate operation was decided upon and performed August 25, 1913. Numerous fragments were removed and the largest of them placed in the salt solution. This left a gap in the bone nearly five inches in length. To fill this gap a long bone splinter was trimmed and driven into the medullary cavity of the upper and lower fragments, the canals having first been vivified with the Murphy reamer. A radiograph taken October 9, 1913 (in the seventh week after operation) is shown in figure 2. Attention is called to the enormous bony callus completely surrounding the graft and more than filling the gap in the bone. There was necessarily primary union and absence of infection. An application of the deductions from

this case resulted in the operation illustrated in figures 6 and 7.

It seemed logical to presume that a bone graft might be taken from a healthy section of the fractured bone and transplanted to the desired area, and that the gap left would fill in while the fracture is healing. Disability of the other limb and added suffering of the patient would be prevented and

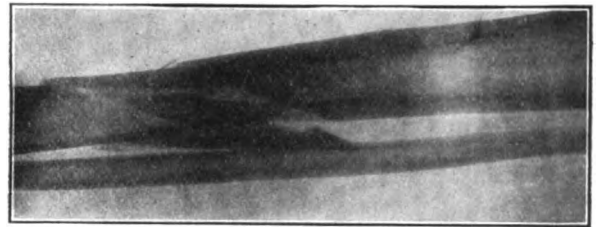


Fig. 1. (P. W.) Extensively comminuted fracture of the tibia. Simple fracture upper third of fibula.

the danger of infection reduced. Experimental work resulted in the evolution of the living bone nail, taken also from the fractured bone.

The first complete sliding graft with autogenous bone nails was made January 28, 1914, at St. Luke's Hospital, for an ununited fracture of the tibia of three months' standing (Fig. 3). The result was pleasing and the patient walked without support in eight weeks. The condition on February 20, 1914, is shown in figure 4, and on March 20, 1914, in figure 5.

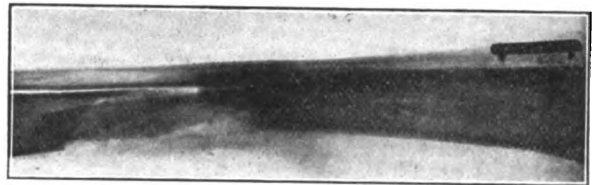


Fig. 2. (P. W.) Result seven weeks after removal of loose bone and insertion of large autogenous intra-medullary graft. Attention is called to the enormous callus more than filling the gap in the bone.

Similar cases, all tibia fractures, have been equally successful. That the method is practical is further emphasized by the fact that Albee has used and described a somewhat similar sliding insert graft held with autogenous bone dowels (*New York Med. Journal*, May 23, 1914).

It will be noted that in the method herein presented, the transplant is inlaid in the prepared medullary canal of one fragment and driven into the medullary canal of the other, maximum



strength is thus provided for. The bone nails are trimmed squarely and driven in  $\frac{1}{8}$ -inch round holes, utilizing the principle of the square boat nail for greater holding power.

The technic of the operation is as follows:

*Pre-operative.* Forty-eight hours before opera-

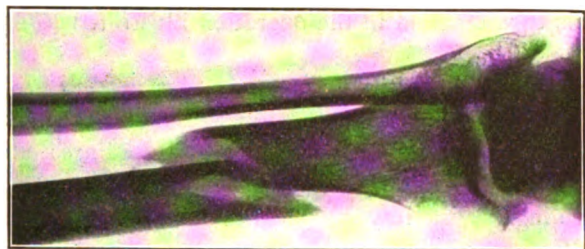


Fig. 3. (H. T. C.) Ununited fracture of the tibia of three months' standing. Operation January 28, 1914.

tion the limb is carefully cleaned with tincture of green soap and water, using gauze sponges, never a brush. A safety razor is used for shaving, taking care not to cut or scrape the skin. The field is then washed for five minutes with alcohol, and a thick dressing wet with a solution of mercuric iodide, 1-20000, is applied and kept constantly moist. (For convenience and accuracy in preparing the solution, McClintock's germicidal discs are used.)

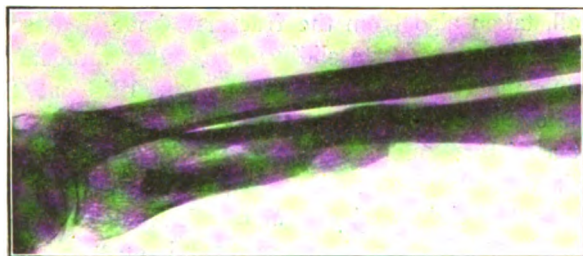


Fig. 4. (H. T. C.) Result February 20, 1914, showing the autogenous sliding graft driven into the prepared medullary canal below, imbedded above, and held by an autogenous bone nail. Callus beginning.

The evening before operation the first dressing is removed, the field again washed with alcohol and a fresh wet iodide dressing applied, to be kept moist and left undisturbed until removed in the operating room.

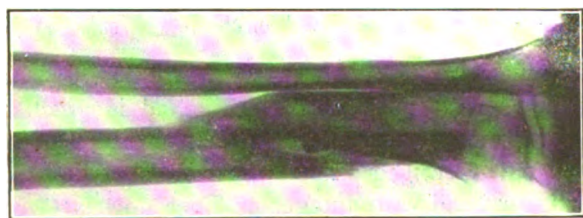


Fig. 5. (H. T. C.) Same case as figures 3 and 4. Radiograph taken March 20, 1914, showing sound, smooth union. Patient walking.

*Operating room preparation.* The wet dressing is removed and, if work is to be done on the tibia

for instance, the entire foot, leg and lower third of the thigh are wiped with iodine in benzine, then painted with  $3\frac{1}{2}$  per cent. tincture of iodine. After the latter coat has dried, the excess is wiped away with alcohol sponges. All applications are made with gauze held in long-handled forceps. Fingers do not touch skin, sponges or anything that comes in contact with the operative field.

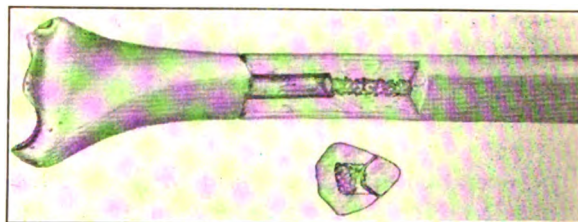


Fig. 6. Showing space left in bone after sliding graft has been cut out. Medullary canal of upper fragment chiseled out to receive prepared graft. Cross section shows direction of saw or chisel cuts in removing graft. Dotted lines show approximately extent of vivification of medullary canal.

A sterile towel is wrapped around the leg; the foot and the knee and lower thigh are bandaged with sterile gauze bandages (Fig. 8). To totally eliminate finger contact, the bandages may be rolled on 6-inch glass rods, sterilized, and applied by holding the rod, without having been touched by fingers.

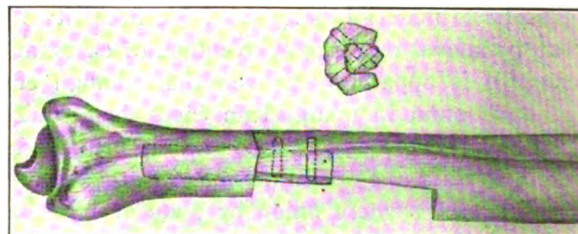


Fig. 7. Lateral view showing sliding bone graft driven into reamed out canal below, imbedded in prepared channel above, and held with living bone nails. Cross section shows direction of drill holes and nails through imbedded transplant and bone. Placed at right angles to each other the holding power of two nails is efficient.

A straight cut with a knife is made through towel and skin and superficial fascia. The edges of the towel are then fastened to the edge of the cut skin; the skin, with its potentialities for wound

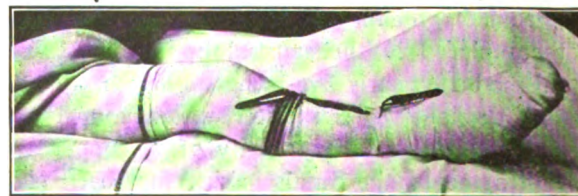


Fig. 8. Leg prepared for operation—covered by sterile towels, foot and knee bandaged. After skin incision the borders of the slit in the towel are fastened to the skin edges with Michel clips. The tenacula shown are no longer used since in placing them they must necessarily have been touched by fingers.

contamination, is thus eliminated. We first fastened the towel, or gauze, or rubber dam to the skin edges with small tenacula, later with silkworm gut,

the needle being passed from within outward, but this latter procedure consumed much time because of knot-tying with forceps. At present we use the Michel clips, so that fastening the protective is but a matter of a few seconds. (This suggestion was made by a specialist in internal medicine. In the course of the development of an absolutely finger-free bone technic the comments of the medical spectators have been most helpful, if often caustic. Further I found that asking a trained surgical nurse to watch every move made by the operator and as-

the wound, nor does anything that goes into the wound ever touch skin. Were it not for the probability of dropping perspiration, aseptic bone surgery might be done with operator, assistants, and nurses working with ungloved and unsterile hands. It is well to have every one connected with a bone operation consider their gloved hands unsterile and do their work with that in mind.

Instruments after being used once are thrown into a basin of mercuric iodide solution, 1/20000, rinsed by the instrument nurse and placed on the working tray so that the handles do not contam-

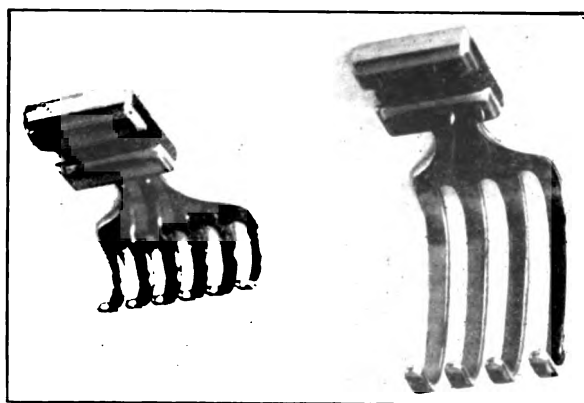
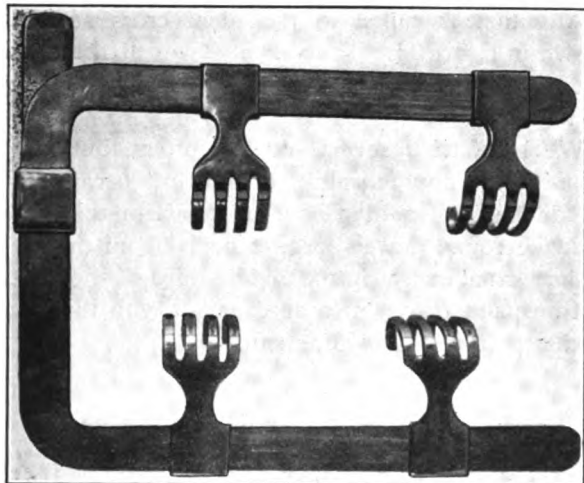


Fig. 9. Self-retaining retractor, adjustable in all directions. The smaller prongs are used in shallow, the long prongs in deep wounds.

sistant as invaluable in correcting many minor as well as major technical errors.)

**Operative technic.** Instruments are taken from the sterilizing tray with forceps and arranged on the table so that working parts do not touch handles; this order is maintained throughout the operation. Gauze sponges, etc., are handled only with forceps; hot salt packs, if used, are wrung out with forceps; and, in general, as has been so emphasized by Mr. Lane and others, fingers never touch the wound or anything that ever comes in contact with



Fig. 10. The ring method of holding the sliding graft. The graft is driven into the reamed out medullary cavity in one fragment and held by an intact ring of bone in the other; no nails or pins are necessary. This method is only practical in the humerus and femur or when fragments can be separated.

inate working parts of other instruments. Before going back to the main instrument table they must be resterilized.

Instruments in constant use are kept on the working tray; the criterion of asepsis here is that the tray towel must never be blood-stained, the instruments having gone through the iodide solution as before stated, and are never thrown down in disorder.

Sponging is done with gauze pads held in long sponge forceps, used but once and then discarded.

Torsion, pressure, hot salt packs, or the Ferguson angiotribe forceps are all agents for the con-

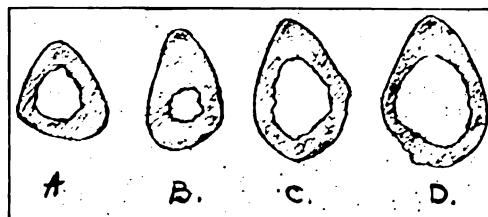


Fig. 11. (Actual size.) Cross sections of an average human adult male tibia. A—Center of lower third; B—Middle third; C—Junction of upper and middle thirds; D—Upper third.

trol of hemorrhage. Should a large vessel require ligation, plain catgut is used, and tied with forceps.

If suture material is used in needles, the threading, placing, and tying are all done with forceps.

The soft tissues having been elevated from the bone, a self-retaining adjustable retractor is placed. I have modified a self-retaining abdominal retractor, lengthening the sliding arms, and fitting

thereon four sliding pronged retractors (Fig. 9). It will be noted that two sizes are used—the long prongs for thigh work, the short prongs for work about legs and forearms—two, three or four of the prongs may be employed, and the wound adjusted at will.

*Technic of sliding transplant.* The bone having been thoroughly exposed the fracture area is cleared and elevated, and in old cases the excess of callus is cut away. The bone ends are trimmed so that they will approximate nicely.

The short fragment is elevated and its medullary cavity reamed out; care must be exercised in old cases that the freshening extends well beyond the area of sclerosis into healthy bone. The transplant must be taken from above or below the sclerosed area. It is cut from the long fragment, by chisel or electric saw, as shown in figure 7. The cuts should slant downward and inward toward the medullary canal and should be started about  $\frac{3}{8}$  inch each side of the crest. This should give a total width through the center of the graft of at least  $\frac{1}{2}$  inch. In old cases the sclerosed ends are cut away.

The medullary canal of the long fragment is gouged or chiseled out as shown in figure 6. The graft is then trimmed so that it will drive snugly into the reamed medullary canal and imbed firmly in the groove in the other fragment with the crest up.

This cutting and fitting may be done with saw or biting forceps, but I have found that a vise and an ordinary cabinet maker's rasp render the work both easy and rapid. An ordinary iron vise, purchasable at any hardware store for 75 cents, and nickel-plated at a cost of 50 cents, is quite satisfactory.

The graft having been placed and the fragments approximated, the transplant and bone are drilled with  $\frac{1}{8}$ -inch or  $3/16$ -inch drills, and nailed with bone nails. The nails are fashioned with bone-cutting forceps and rasp from splinters which have been cut from the bone at the time the graft is removed. In the tibia, we have found it best to take material for bone nails from the side of the bone rather than the crest, since the latter is denser and more brittle.

The wound is closed with Michel clips, a carbolic dressing is applied, and the limb put up in plaster, taking care to immobilize joints above and below the fractured area.

*The ring method of holding transplants.* This method is applicable to single round bones. The medullary canals of both fragments are reamed out. The graft is lifted from the bone far enough

away from the fractured area so that a ring at least one inch in width is left. The graft is then inserted as in the usual intra-medullary operation; no nail, wire suture is necessary.

This method may be used in any case where both fragments can be elevated, and it is also applicable to cases where moderate gaps exist.

In bone transplantation, particularly in intra-medullary bone grafting, some consideration of the size and thicknesses of bone, especially of the tibia, and diameter of the medullary canals seems important.

Attention is called to the tibial cross sections shown in figure 11. The varying sizes of the canal and thicknesses of bone from which grafts may be taken are worthy of notice.

We have tried several dowel cutters, but have found them impractical in tibial work because of the difficulty of getting bone of sufficient thickness to make round dowels large enough to fill the medullary canal except in the middle third of the bone. A transplant trimmed to an exact fit with the rasp seems to fulfill all requirements.

#### THE SEVENTH INTERNATIONAL CONGRESS FOR OBSTETRICS AND GYNECOLOGY.

New York, September 13-17, 1915.

The Seventh International Congress for Obstetrics and Gynecology will convene in New York City, U. S. A., on September 13, 1915, and the Scientific Session will be held on September 14, 15, 16 and 17, 1915.

There will be one scientific session each day from 9 to 1 and the afternoons will be devoted to clinics, etc.

The following is an outline of the scientific program:

1st theme: The Remote Results of Operations for the Relief of Retrodisplacements of the Uterus, Both Simple and Complicated. Reporter, Prof. Th. H. Van der Velde, Haarlem, Holland.

2d theme: The Treatment of Puerperal Infections. Reporter, Dr. Edward P. Davis, Philadelphia, Pa., U. S. A.

A prominent feature of the program will be: The Value of Radioactivity in Gynecological Therapeutics; 1st, Roentgen Ray; 2d, Radium; 3d, Mesothorium. This may be discussed in individual papers or in the form of reports.

Friday, September 17th: Miscellaneous Papers.

National societies are encouraged to discuss these subjects at least eight months before the meeting of the Congress, and to have reporters collect and digest the discussions and report their conclusions.

## BONE REGENERATION: AN EXPERIMENTAL STUDY.\*

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The problem herein discussed is not a new one, but it has more interest for us to-day than it had for our predecessors. In an endeavor to find out from the literature of the past what theories have been held regarding regeneration of bone, I naturally turned to the question of repair of fractures, as it seemed to me the only phase of the subject which must have been known to the ancients. Hippocrates held that callus was formed from the marrow, as the marrow was thought to be the nutritious juice of the bone. Galen held that callus was due to excessive nutritious juice brought to the bone by the blood. In 1609, Jacque de Marque demonstrated that marrow could *not* of itself furnish the materials for callus. In 1741, Duhamel attributed callus to the ossification of the periosteum and of the medullary tissue. In 1859, Malgaigne, in his surgery, stated: "To sum up, then, callus is formed by an effusion of plastic lymph probably secreted from the periosteum and the medullary tissue, perhaps also by the surface of the fracture."

Antivivisection sentiment was so strong prior to this time that a surgeon (Jobi Merken, 1682) had been threatened with excommunication because he had placed a piece of dog's skull in a defect in the skull of a soldier.

This being the case, we can understand that knowledge of the function of the periosteum and bone fragments marked time. However, in 1867, Ollier's illuminating work appeared. He stated that it was the periosteum which lived and that the bone died and was replaced by vascular granulation tissue from the periosteum. This view is still held by the majority of authorities, if we can take a review of the literature as an index of the sentiment of the profession.

In 1907, we find that Axhausen,<sup>1</sup> after a study of an amputation stump in which a defect in the metatarsus had been replaced by a transplant from the tibia fifty-one days prior to the amputation, states: "Bone cells do not possess the property of forming new bone. This is exclusively the property of periosteum and the bone marrow. . . . The implanted bone dies throughout and is replaced by new bone from the periosteum and bone marrow."

In 1910, Janeway<sup>2</sup> successfully transplanted

fresh bone with adherent periosteum. The radiographs of the case demonstrate a progressive increase in the size of the transplant. Janeway states: "We *must assume* as a result of the conclusions of research work (not his own) upon implanted bone and periosteum that the implanted bone itself had died, but that the periosteum and marrow had lived and replaced the old bone with new." I do not think that his *x-ray* pictures bear out the *assumption*, as in none of them is there evidence of a rarefying process which is characteristic of bone death. Janeway further tells us that all save David, Adamikiewicz, and Laurent agree on the osteo-conductive nature of transplants, and that all regenerative changes are solely due to the living and regenerative power of periosteum and marrow. He overlooks Sir William Macewen entirely, although the latter had published in 1909<sup>3</sup> cases of successful bone transplantation, done in one case thirty years before; and in some of his cases Macewen had not transplanted periosteum with the bone.

One case cited by Macewen was operated upon by him in 1878. This case was one of chronic osteomyelitis of the humerus in a child, age three years. After nine weeks' treatment (drainage) the patient not having improved as desired, the entire humeral diaphysis was removed subperiosteally. Only at the proximal end was there any bone projecting. The walls of the periosteal tunnel that was left gradually coalesced without the formation of new bone. Fifteen months later the parents brought the boy back to have the arm removed because it was worse than useless. Instead of amputating, transplants from the anterior aspect of the tibia of another patient were made. These transplants were cut into minute fragments, irrespective of the periosteum. The bulk of the fragments had *no* periosteum adhering to them, having been taken from the interior of the bone. These were deposited into the muscular sulcus. *Two months* later new bone one inch in length, three-fourths inch in thickness, was attached to the upper fragment of the humerus. All the grafts proliferated, grew to one another, and to the proximal portion. The patient, now a man, has a useful arm, the humerus measuring eleven inches. This brings us down to the interesting contributions to this subject by John B. Murphy.

In 1912, Murphy<sup>4</sup> stated:

1. "The periosteum fully detached from bone and transplanted into a fatty or muscle tissue bed in the same individual, if he be young, may produce a lasting bone deposit.

2. "Periosteal strips elevated at one end and at-

\*Annual Address, Academy of Medicine, Nashville, Tenn., January 6, 1914.

tached at the other, if turned out into muscle, *re-produce* regularly bone on their under surface.

3. "Bone transplanted without the periosteum into muscle or cellular tissue *always dies* and is ultimately absorbed.

4. "The graft is *per se* not osteogenetic but osteoconductive."

In 1913, Murphy<sup>5</sup> seemed to have changed his views, as follows:

1. "Normal periosteum completely detached from bone and transplanted into a muscle tissue bed in the same individual, if he be young, may produce a permanent bone deposit, *but only if osteoblasts remain attached to the lower layer of the periosteum. The periosteum of itself is not osteogenetic; it is rather a limiting membrane.*"

2. Statement 2 of 1912 is modified by adding, "But not unless there are osteoblasts attached to it."

Macewen, the pioneer of new thought in this field, states:

1. "The periosteum has no osteogenetic function."

2. "Where bone is said to have been reproduced from periosteum bone plaques must have been raised with the periosteum."

3. "It has been shown that the bone from the diaphysis can be transplanted in bulk and that it grows without the intervention of periosteum."

Albee, of New York, has recently added confirmatory evidence of part of Macewen's work. In his summary he tells us that "it seems to be largely a question of definition of what the periosteum is and what it includes as to whether it is osteogenetic or not." Let us, then, turn our attention for a few moments to this question.

We find two definitions of periosteum. According to one, periosteum is made up of three layers: (1) an outer fibrous layer possessing blood-vessels, (2) an inner fibro-elastic layer made up of elastic fibers and containing lymph spaces, (3) an osteogenetic layer. According to the other definition, periosteum is a fibrous membrane composed of two layers, the inner of which contains many elastic fibers and blood-vessels. Beside these two recognized layers, however, there is a quantity of loose areolar tissue existing between the inner of the two layers and the bone. It is sufficiently loose to permit of easy penetration by the osteoblasts from the underlying osseous tissue. In healthy adult life the subperiosteal areolar space contains few or no osteoblasts.

As a result of such divergent views concerning the nature of the periosteum have arisen the present-day theories concerning the function of the

periosteum. As we have seen, the majority of observers believe with Ollier that periosteum is the chief regenerator of bone.

Macewen's view is as follows:

1. The periosteum aids in the nutrition of bone because of its abundant blood supply which is distributed through the haversian canals to the bone.

2. The periosteum is a limiting membrane.

3. Since it contains no osteoblasts, no osteoblastic reproduction can ensue from periosteum which is detached from the bone.

4. In cases where bone is said to have been produced from transplanted periosteum, bone plaques must have been raised from the bone in process of removal of the periosteum, and have been transferred along with it.

Believing, as I do, as a result of experimental data, the latter theory of the function of the periosteum, there must be found a suitable explanation of

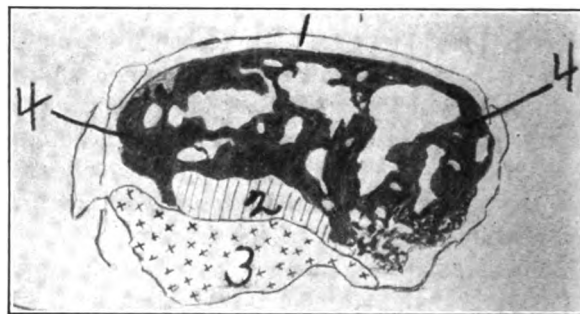


Fig. 1. Section from periosteum-free bone transplant in rectus muscle. Low power. (1) Newly formed connective tissue envelope, i. e., new periosteum. (2) Rapidly growing periosteum. (3) Granulomatous connective tissue. (4) The black areas are bone.

the regeneration of bone through the agency of the osteoblast, the embryonic bone cell

1. Primary ossification proceeds through cartilage: in fact, the osteoblast is the result of division and liberation of the nuclei of cartilage cells.

2. Primary periosteum is a connective tissue tube in which the centers of ossification are laid down. Without the deposition of such centers of ossification, bone is not formed and there is then any one of the possible congenital anomalies due to the absence of a part (acheiria).

3. Bone is living tissue, and as such must undergo a constant process of renewal and repair. Such changes can only occur, according to Macewen, as follows:

4. Following stimuli to bone, the cells on the interior proliferate, and escape through the Haversian canals into the subperiosteal space; there they find room for proliferation and may ultimately contribute to the breadth of the shaft.

With this brief and incomplete review of the



past and present opinions of these questions, I shall consider some of the experiments that we have carried on during the past nine months.

We have not nearly completed what we have planned, and should there be contained in these statements anything which is afterward proven incorrect, we expect to immediately acknowledge our error.

As one can readily see, the main points of variance among authorities are:

1. Has the free bone transplant an inherent osteogenetic function?
2. Has the periosteum an osteogenetic function?
3. Is periosteum necessary for bone growth?
4. Is the periosteum a limiting membrane?

Dogs, young and old, cats and rabbits have been

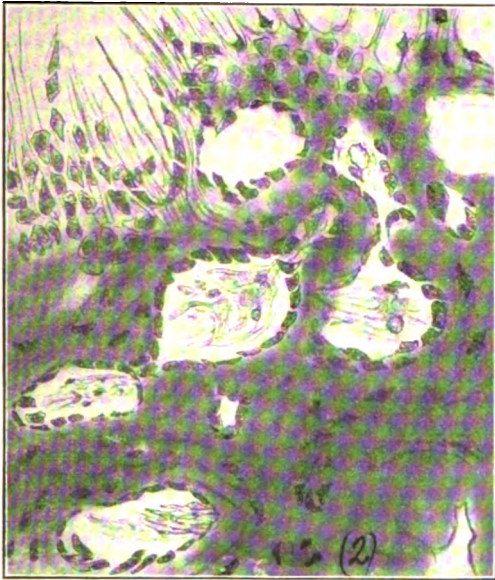


Fig. 2. High power field in the same section showing the rapidly proliferating bone-forming cells lining the Haversian systems.

used in our experimental work. Ether anesthesia was used in the series.

For the reason that the majority of observers has contended that bone transplants die, particularly if they are deprived of their own blood-supply, of periosteum, and of contact with bone, we have subjected our bone transplants to these most adverse conditions.

In one instance, pieces of a trephine button free of periosteum were transplanted into rectus muscle and omentum (Exp. 1); after six weeks microscopic examination revealed the presence of hard masses (bone) in the site of the transplants.

In another experiment a subperiosteal resection of a rib was done and fragments of bone were placed in the rectus muscle, omentum, and spleen. Five weeks later we found that the bone was still

where it had been transplanted. Histological examination by my colleague, Prof. Gustav Mann, gave the following information:

"The results of histological investigation show that after transplantation of a piece of rib into the rectus muscle, and into the spleen, and after wrapping up a fragment of bone in the omentum, there is no indication of absorption after five weeks. The piece in the omentum is least active; that in the spleen shows distinct signs of bone formation. The Howship's lacunae on the surface are well marked; lying in the lacunae are osteoblasts. The best evidence of active bone proliferation was seen in the rectus muscle. The appearances seen here are identical with those seen in the jawbone of a newly born kitten. The bony trabeculae are lined with bone-forming cells arranged so close together as to almost form the palisade. From the projecting points of the trabeculae streamers of osteoblasts pass out into the surrounding tissues. It is always easy to tell whether any particular surface or trabecula is actively engaged in bone formation because of the deep staining of the cells and cell nuclei, for they will remain after the other cells have become decolorized."

In two experiments transplants free of periosteum have been placed in the anterior chamber of the eye of a cat. In both instances the fragments have increased in size.

As a result of the information gained from these experiments we feel justified in stating that small free bone transplants do not always die, but may live and grow. In other words, thus far we believe with Macewen in the inherent *osteogenetic* function of *bone transplants*. We are now conducting experiments relative to the large free bone transplants.

The osteogenetic function of the periosteum, having been lauded by many and accepted by most, has been denied by Macewen, and only in the last article by Murphy has he receded from his former acceptance of that belief.

A strip of periosteum which remained attached above was elevated from the shaft and made to surround a muscle bundle, after which we sutured the divided ends of periosteum (suggested by Macewen). When the animal was killed six weeks later no bone growth had proceeded from the elevated periosteum. Periosteum was transplanted as a band around the carotid artery (twice, into the anterior chamber of the eye of a cat, and into the erector spinal muscle. In none of these experiments did we note the growth of bone from the periosteum.

Further, the periosteum showed less vitality than the bone transplants in the experiment on the eye, because we noted that the periosteum had been absorbed and the bone had grown.

Is periosteum necessary for bone growth? That it is not seems clearly proven by the results of experiments dealing with Question 1. To satisfy ourselves further we removed the periosteum entirely from the shaft of growing bones, compared the two after six weeks, and found no difference in their diameters. Further, we fractured both tibiae in the same animal; on one side the periosteum had been previously stripped from the shaft above and below the proposed site of fracture; on the other side the periosteum was not removed. Callus was formed in large amounts, giving a perfect union on both sides.

When periosteum was elevated from the shaft, in some instance nodules appeared on the cortex from which the periosteum had been removed.

We see, then from these experiments that periosteum is not essential for bone growth and that it acts as a limiting membrane.

These last two facts are of great importance in respect to the future ideas governing the repair of fractures.

#### CONCLUSIONS.

1. We believe that small bony transplants are osteogenetic and not essentially osteoconductive.
2. Periosteum has no osteogenetic function, but is rather a limiting membrane.
3. Periosteum is not essential to the repair of defects in bone.

I wish at this time to acknowledge my indebtedness to Prof. Mann for the courtesies he has shown me. Had it not been for his willingness to assist me in this work I should have had to abandon it. During the entire time he has manifested marked interest in all details of the work.

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#### DUODENAL ULCER.

The results following gastro-enterostomy for duodenal ulcer are very good. But a small percentage of cases may not be cured by this procedure and in these the excision of the ulcer with a plastic operation on the outlet of the stomach, while giving a slightly higher primary mortality, will yield a higher percentage of permanent cures.—W. J. MAYO in *The Lancet-Clinic*.

## PYELOTOMY VS. NEPHROTOMY IN NEPHROLITHIASIS.

RALPH DUFFY, A.B., M.D.,  
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The object of this paper is to discuss the advantages and disadvantages of incision of the kidney parenchyma and pelvis, respectively, for the relief of stone—a matter about which great difference of opinion exists among the foremost operators.

Henry Morris,<sup>1</sup> in 1880, was the first to open an otherwise healthy kidney for the relief of stone. He incised the parenchyma. Following the lead of this great teacher, nephrotomy for stone has always been the popular operation among English-speaking surgeons. It is remarkable that Czerny as far back as 1880 advocated incision of the kidney pelvis, but up to within very recent times his views and those of his followers have been unpopular. However, there has been in the last few years considerable tendency for the pendulum to swing the other way.

I have always practiced nephrotomy in the removal of renal calculus, fearing fistula from pyelotomy, but an extremely grave hemorrhage in an otherwise simple case led me some time ago to modify my views to some extent. In that case, following the removal of a simple stone from an infected kidney, the wound in the kidney being closed with a tube drain, hemorrhage occurred on the fourth day and resisted all attempts at packing the wound. Nephrotomy was finally done on the sixth day when the patient was almost exsanguinated. On examining the kidney removed, all the sutures had held, and as far as could be determined the bleeding came from the eroded drainage tract. However, as this tract had been tightly packed to stop the hemorrhage, its raw appearance may have been due to this manipulation.

#### ADVANTAGES OF NEPHROTOMY.

In the first place, nephrotomy can be done without dislocating the kidney out of the wound. Hence in the case of a short pedicle, or of adhesions binding the kidney down, it is obligatory. Israel<sup>2</sup> considers pyelotomy of but limited application because it is generally not possible to deliver the kidney out of the wound, an end he considers essential, for the proper opening of the pelvis and the later care of the wound. Kuemmel<sup>3</sup> also declared that large stones and those in the parenchyma of the kidney could not be removed by pyelotomy.

All of the earlier writers accused pyelotomy of the formation of permanent fistulae.

When suppuration exists and drainage is neces-



sary, nephrotomy is certainly to be preferred. It would seem to me that the main indications of nephrotomy are suppurative conditions of the kidney, inability to deliver the organ into the wound, and a branched condition of the pelvis with the stone in the primary branches, that is, high in the kidney substance.

#### DISADVANTAGES OF NEPHROTOMY.

The great objection to nephrotomy is hemorrhage. This may come on at operation, or within twenty-four hours, or be deferred as long as three weeks following operation. It may be slight or fatal. Various causes have been assigned for this complication. It is said to occur quite as frequently in small incisions as in large. Mueller<sup>4</sup> considers arteriosclerosis the main factor. Neuhaeuser<sup>5</sup> believes that the hemorrhage is due to distension of the pelvis and separation of the cut surfaces due to blocking of the ureter by a clot. Eisendrath<sup>6</sup> thinks that pressure of drainage material is the cause, but this would not explain hemorrhage in non-drainage cases. Belfield<sup>7</sup> considers hemorrhage to be always due to faulty technic.

That severe hemorrhage following nephrolithotomy is by no means a rare complication is clear from the reports from the various clinics. Neuhaeuser<sup>5</sup> from Israel's clinic reports nine per cent. of serious hemorrhage following nephrotomy with several deaths. Pleschner,<sup>8</sup> from Casper's clinic, reports three cases of hemorrhage with one death. Zuckerkandl<sup>9</sup> reports two cases with one death. Baum<sup>9</sup> reports four cases with one death. Makas<sup>10</sup> reports nineteen cases. Krotoszyner,<sup>11</sup> Bevan,<sup>12</sup> and Jacobson<sup>13</sup> report fatalities also. There must be many fatalities from this source which never appear in the literature.

At the time of operation, the hemorrhage can be controlled by pressure on the pedicle, either with a special clamp or by the fingers of the assistant. Approximation of the cut surfaces by through and through sutures of catgut are our reliance after operation. Lower,<sup>14</sup> of Cleveland, claims to prevent post-operative hemorrhage by ligating the spurting vessels on the cut surface with fine chromic catgut. I have tried to do this, but gave it up as futile.

The line of incision used in this country is the one suggested by M. Broedl,<sup>15</sup> just posterior to the convex border of the kidney. The incision through this line is made parallel to the posterior surface of the kidney and runs through the division between anterior and posterior arterial trees. Zondek<sup>16</sup> advocated practically the same incision. Cullen and Derge<sup>17</sup> advised dividing the kidney with silver

wire, and claim that the hemorrhage and scar formation are reduced one-half. However, these observations were made on dogs, and the same reasoning would not necessarily hold for kidneys rendered fibrous by disease. Complete bisections of the kidney will always carry along with it danger of hemorrhage, and it should not be necessary in these days of perfected radiography.

#### PYELOTOMY.

The last three years has shown a marked trend of favor toward pyelotomy for renal calculus. Eisendrath,<sup>18</sup> Bazy,<sup>19</sup> Casper,<sup>20</sup> Baum,<sup>9</sup> Lower,<sup>14</sup> Gibbon,<sup>21</sup> Schenker,<sup>22</sup> Krotoszyner,<sup>11</sup> and Cabot<sup>23</sup> are all recent advocates of pyelotomy.

It must be granted that pyelotomy cannot always be practised. In the first place, the kidney cannot always be delivered well up into the wound. To increase the ease of delivery, the twelfth rib may be excised. W. J. Mayo<sup>24</sup> advises the free exposure of the twelfth rib and the division of the quadratus and the lateral arcuate ligament which binds the rib to the transverse process of the first lumbar vertebra. He says this gives excellent exposure and obviates the necessity for rib resection. The dissection must be made with caution to avoid injury to the pleura.

Again, the type of pelvis best adapted to pyelotomy, the ampullary or sac-like, may not be present, but the pelvis may be branched, either bifid or trifid, and the stone may be lodged in one of the branches. Eisendrath<sup>18</sup> finds the pelvis branched in twenty per cent. of the cases. A branched pelvis is not on the whole suitable for incision for exploratory purposes. Indeed, incision of the pelvis for exploration for stone is of doubtful benefit in any case. For in my experience one can feel as much by holding the kidney in one hand and hooking the index finger of the other in the kidney notch with the pelvis intact.

With proper manipulation quite large stones can be removed through the incision in the pelvis. Garré reports the removal of a stone weighing 135 grammes.

As to the incision itself, it is best made by elevating the pelvis with two stay-sutures and snipping a hole with fine scissors. Care should be taken to incise and reflect the layer of fatty tissue covering the pelvis and to carefully displace any vessel that may be in the line of the proposed incision (W. J. Mayo<sup>25</sup>). The incision is to be carefully closed with fine catgut unless it is intended to be drained, though if pus be present nephrotomy is the operation of choice. The incision should not reach the uretero-pelvic junction lest stricture of the ureter result from contraction.

Hemorrhage is not marked in pyelotomy as a rule, but it may occur. Writers of experience counsel gentle manipulation in delivering the stone lest marked bleeding follow. The bleeding seems to come from the stone tearing through the eroded pelvic wall into the surrounding venous plexus (Eisendrath<sup>18</sup>).

Fistulae following pyelotomy, formerly so feared, seem latterly to be much less frequent. The fatty layer covering the pelvis should be replaced. Payr<sup>16</sup> advises fortifying the incision with a flap of the fibrous capsule of the kidney. The ureter should always be catheterized to insure that it is patent.

In conclusion, from a review of my own experiences and those of others I am convinced that pyelotomy is destined to win more and more over nephrotomy on the basis of its merits as a simpler and safer operation.

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#### NYSTAGMUS AND CEREBELLAR DISEASE.

Nystagmus is an irritative motor cerebellar phenomenon, since it may be produced in monkeys by irritation of the nuclei of the cerebellum. Cerebellar nystagmus is usually manifest on turning the eyes towards the diseased side. Patients with cerebellar disease lie as a rule on the diseased side, because they cannot then turn the head toward that side and thereby the nystagmus, dizziness, and vomiting are lessened. The localizing value of this symptom must not be placed too high.—S. P. KRAMER in *The Lancet-Clinic*.

#### SUSPENSION LARYNGOSCOPY IN AMBULATORY PATIENTS.

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Although it is but little more than two years since Killian published his epoch-marking suspension laryngoscopy, many men have turned their attention to this new procedure in the examination of the larynx. In my opinion it is to be regarded as an improvement in the technic of direct laryngoscopy as introduced by Kirstein, rather than as a new method of laryngeal examination. In the older method the handle of the speculum is held and steadied by the operator. This requires often great muscular effort and is very fatiguing, especially while operating through the speculum. In suspension laryngoscopy the speculum is self-retaining and is supported by an adjustable mechanism.

To review briefly the apparatus and its method of employment: It consists of two portions, the direct speculum and the suspension apparatus. The direct speculum is made up of a hook-shaped handle, at the lower end of which there is fastened a grooved spatula, V-shaped on cross section with its distal end bent slightly upward, flattened out and broader than the rest of the spatula.\* It is fastened to the handle at a little less than a right angle. The spatulae are interchangeable and of different sizes for adults and for children, for males and for females. Later forms of spatulae in which there are movable central blades to raise and hold the epiglottis after the introduction of the spatula into the mouth and its adjustment on the tongue, have been devised by Albrecht. I have not met with any difficulties in the use of the original Killian spatula, and in fact the new form somewhat limits the field of vision and interferes in operative work.

At the lower end of the handle there is a mouth-gag and an adjustable tooth plate which serve to hold open the mouth and to preserve the proper relations between the instrument and the head of the patient.

The handle itself is 32 cm. long, curved slightly forward at its upper end and bent into a hook whereby the instrument is suspended from the crane. The original rigid handle of Killian has been modified by Albrecht and again by Killian himself, their object being to bring the point of

\*The speculum and the hook have undergone a number of modifications which in my opinion serve to complicate the technic and to make the procedure more painful and uncomfortable for the patient without materially increasing the size of the field of operation or rendering it more easy of approach.

suspension directly over the tip of the speculum. Albrecht does this by introducing a track at right angles to the shaft of the handle, on which the upper section moves backward or forward by means of a rack and pinion. In Killian's new handle the upper portion has a circular motion whereby it is raised and lowered, thus bringing its extremity, when the lower portion is fixed, further forward or backward. In a number of experiments undertaken to determine the points of greatest pressure and the directions of the various forces at play on patients in the suspended position, it was found that there was least pressure on the larynx and therefore least likelihood of causing trauma or possible edema when the old handle of Killian was used. Practically, the modified handles furnish additional means of adjustment and are supplemental to the natero-posterior movement of the crane on its track.

The crane has a horizontal arm which extends transversely across the table from which the patient is suspended by means of the hook-shaped handle. It has a vertical and an antero-posterior motion.

The patient is placed supine on the table, the head hanging free and held by an assistant. The tongue is drawn forward by the operator until it is just beyond the teeth. This is very important. If it be brought too far forward it will be caught between the teeth and the instrument and lacerated. If it be not brought out and held by the operator until the instrument is fixed the spatula will slip away from the surface of the tongue and the latter will fall away from the midline and obstruct the field of vision so that it may be impossible to bring the anterior commissure into view.

The spatula affixed to the handle is then passed into the mouth and downward until it is under the epiglottis. The distal end is raised until the larynx is brought into view, the mouth-gag is opened and the handle suspended from the crane. The instrument is manipulated by moving the crane backward and forward and up and down until the anterior commissure is brought into view.

In our work we have adopted this as the standard of a satisfactory suspension. It is, of course, not difficult to introduce the spatula under the epiglottis and to lift it up until one sees the arytenoids and the posterior portions of the cords, but the bringing of the anterior commissure into the field requires a proper adjustment of the head by manipulation of the crane until the proper relations between the antero-posterior and vertical movements have been attained. This is not always possible, even by those who have become skilled in the use

of the instrument. The same difficulties sometimes encountered in the older methods of direct examination are met with this one—short, thick neck, rigid muscles, a thick tongue, long, prominent incisor teeth or a larynx bound down by adhesions.

Killian lays great stress upon the anesthesia and upon the anesthetic. Needless to say a complete relaxation of the muscles of the neck and the intrinsic muscles of the larynx and tongue is necessary for the successful outcome of this procedure. In his adult patients, Killian uses scopolamine and morphine, the former solution freshly made, in two doses of 1/200 gr. scopolamine and 1/6 gr. morphine injected hypodermatically two hours and one hour before operation. If this be not sufficient he gives a third injection of half the above dose. As a local anesthetic he applies 20 per cent. cocaine, ten to twelve drops, to which is added a few drops of 1/1000 adrenalin solution.

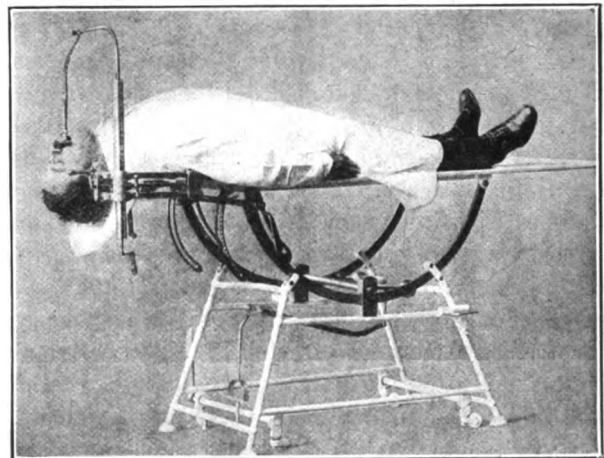


Fig. 1.

I have used the suspension method for the last two years and have attempted to make it a routine procedure in out-patient work. In this I have met with success, having encountered very few patients who refused to allow the suspension a second time. Twenty per cent. cocaine and 1/1000 adrenalin are thoroughly applied directly to the larynx. Sufficient cocaine is coughed up to anesthetize the pharynx. In some cases the anesthetic was used as a spray, but the former method is preferable. Scopolamine and morphine cannot very well be used in out-patient work. After waiting for about ten minutes the patients are placed upon the table and the spatula is introduced. Only minor operative work can be done if the patients are to be sent home. Most of the suspensions were undertaken for examination of the larynx when a good view could not be obtained by the ordinary indirect method. Specimens for examination and small

growths of the cords, such as papillomata, were removed. Cases of stubborn chronic laryngitis behaved well under suspension treatment. The applications can be made more directly to the lesions, and small amounts of strong solutions can be applied with more benefit than with the methods commonly in vogue.

After resting for a short while the patients are allowed to go home. In no cases were there any untoward results. There was no difficulty in breathing or in swallowing and only occasionally did a patient complain of a sore throat or of a sore tongue. Several patients complained of slight stiffness of the neck and pain for a few days after the procedure.

The more extensive operations, those requiring general anesthesia or where there is a likelihood of the patient's being suspended for some time, are not ambulatory cases. These patients are sent into the hospital and their treatment and the results therefrom do not come within the scope of this paper.

In none of the ambulatory patients is the suspended position maintained for more than five or ten minutes. It must be remembered that these patients have been given no morphine and that they are fully conscious. They approach the procedure without a narcotic, and it is worthy of note that almost invariably they are willing to submit to further suspension. When one considers the class of patients one sees in the average out-patient department, their comparatively low average of intelligence, their often high-strung nervous organization, and their great fear of pain, it is evident that only a slight amount of pain or even of discomfort is caused by this method.

The results of our work in this field have shown us that suspension laryngoscopy is capable of a wider range of usefulness than it has hitherto developed, that it can be done on ambulatory patients for examination and minor operations under local anesthesia without having previously narcotized the patient with morphine, and that in adults at least it is an entirely justifiable procedure.

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#### CECAL TUMORS.

The tumor formation of both malignant and tubercular ceca are very apt to be mistaken for appendix abscesses. Sometimes, indeed, the malignant disease may have engrafted on to it some pus formation. A diagnosis of appendicitis in the aged should always be attended by a grave prognosis.—R. E. KELLEY in *The Medical Press and Circular*.

## STRAIGHT DIRECT LARYNGOSCOPY, BRONCHOSCOPY AND ESOPHAGOSCOPY.

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(Continued from October Number.)

*Some general remarks on the extraction of foreign bodies.* The subject of the removal of foreign bodies from the trachea and bronchi is of such importance that a few general remarks will not be amiss, though the writer may be accused of repetition. In the beginning it may be said that when a foreign body is known to be present or is supposed from the symptoms, the sooner one operates the better. To wait even a short time for the patient to expel by coughing is dangerous and uncertain. Especially with such objects as beans and grains of corn is delay fraught with the most serious consequences, for, each minute, they are swelling, and if impacted in a bronchus, they will finally cut off all air to the lung, which will collapse. Then, in the effort at removal if the body should be dislodged and slip into the bronchus of the sound side, sudden death would result because of the complete collapse of the other lung. These cases are extreme, but, in view of the fact that beans are always difficult to extract, one cannot be too careful in their attempted removal. Cases of sudden death in children after the introduction of the bronchoscope, in which the only symptoms noted were stoppage of respiration and cyanosis, were probably due to the above cause. Statistics show that only 20.5 per cent. of all foreign bodies are expelled spontaneously. Kahler, who collected data from bronchoscopists throughout the world, shows that in 291 foreign bodies treated in 1910-1911, only thirteen (4.5 per cent.) were unsuccessful, which is a great triumph for the bronchoscope. In no branch of medicine do fixed rules or methods enter less into operation than in the removal of foreign bodies. The skill of the operator, his personal ingenuity, and the knack of making instruments to fulfill the requirements in cases out of the ordinary are of greater importance than rules of procedure. In certain cases the removal of the foreign body must be proceeded with, though pneumonia be present, for the only hope for the patient lies in successful operation. It is remarkable how quickly the disease clears up after the removal of the ob-

ject. The writer has mentioned the necessity of having tracheotomy instruments ready in every case of bronchoscopy, and this is of greater importance when a general anesthetic is administered. Success in the removal of foreign bodies depends upon many things, one of the most important of which may be designated "bronchoscopic judgment," by which is meant the ability of the operator to judge of the patient's stamina and vitality. Thus, a patient who has had active symptoms for some days as dyspnea, cough, etc., will have to be handled most carefully as regards the time devoted to the examination. In such cases the question of tracheotomy has to be seriously considered as to whether the shock of the operation will be less than the attempted removal by high bronchoscopy. In children the examination must be made as quickly as is consistent with safety; by this the writer does not mean that one should hurry unnecessarily in passing the instruments, but the time of the operation should not exceed fifteen or twenty minutes. In doing bronchoscopy one must proceed slowly for rapid work not only means danger to the patient from the rough use of instruments, but one is apt to overlook the foreign body. Repeated short examinations are far better than one prolonged seance, especially in children. If general anesthesia is used, the shock is added to. It is quite probable that prolonged examinations in children under general anesthesia have resulted fatally after the removal of the foreign body. The question of tracheotomy is a difficult one to answer. In this country Jackson prefers to do the high operation even in cases where a tracheal wound already exists, but he is an unusually skillful operator. In Europe, Brunings strongly advises opening the trachea in children under two years of age by "less practised workers." Brunings' tubes are certainly large for infants, and one must extract the object through them in a very short time if he does not want edema of the glottis. The writer has demonstrated that one can become expert in the use of smaller tubes by practice and the danger to the larynx is far less. In children with severe dyspnea and cyanosis, the writer believes that tracheotomy with the immediate passage of the bronchoscope is the safest method of procedure. The trachea can be opened and the bronchial examination made without anesthesia in young children, while in older children one can do the tracheotomy under local anesthesia and then, if necessary, give a general anesthesia for the bronchoscopy. In general the use of the smallest possible forceps is an advantage, for one is able to see better around them. The writer prefers the Large

forceps for the small tubes and the Brunings extension instrument for large tubes. The Pfau forceps are used for larynx work and for removing microscopic specimens from all parts of the respiratory tract. In adults, foreign bodies can often be removed with the patient sitting and the use of local anesthesia; some patients, however, are so nervous that general anesthesia is safer. After the bronchoscope is in the trachea and the foreign body located, anesthetization of the membrane above the object must be done carefully so as not to push it further down. This can be done with the cotton carriers or with the spray apparatus already described; with the latter there is no danger of pushing the body down. For most foreign bodies the "claw" tip attached to the Brunings forceps is probably the best grasping instrument; with it soft bodies such as beans, peanuts, etc., can be grasped without danger of breaking them up. In working without general anesthesia, the writer invariably gives a hypodermic injection of morphine and atropine, which quiets the patient and prevents the formation of secretion, which is a troublesome factor. For certain bodies special methods of extraction must be used; thus, for a collar button, Brunings has a tip which grasps the button by its broad base so that it cannot slip off. He also has a snare for removing needles, nails, etc., that lie obliquely across the bronchus; he claims that it will always bring the object parallel to the axis of the lumen and will thus prevent its sticking into the wall. This instrument, according to Brunings, can be used successfully when the foreign body cannot be seen on account of excessive secretion or the narrowness of the passage. The loop is made as large as the diameter of the bronchus will permit, so that, as it is pushed down, the foreign body will be with certainty included in it.

One of the most difficult cases apparently has been transformed into a comparatively simple one by the Jackson dilators. They are instruments for use in chronic foreign body cases in which a stenosis of the bronchus has formed in front of the object. They can be attached to the scissors handle and, after dilatation has been accomplished with them, the foreign body can easily be removed. With the Jackson tubes there is no difficulty in seeing the tertiary bronchi and with forceps small enough foreign bodies can be seized and withdrawn from them. One of the most difficult foreign bodies to remove without injury to the patient is the open safety pin, especially when the point is up. Various instruments for closing the pin have been devised; McCoy's tip for the Brunings forceps is useful when

the pin is small, but will not work with large pins; on one blade of the forceps is a groove in which the body of the pin fits, while on the other blade is a small hook into which fits the open point. When one succeeds in getting the point into the hook, the blades are closed so that the pin is rendered harmless and can be extracted without difficulty. The writer feels that in the present advanced stage of bronchoscopy, certain external operations such as thoracotomy, bronchotomy, and pneumo-bronchotomy do not need to be considered in a book of this character. He is convinced that the great majority of foreign bodies can be successfully removed with the aid of the tubes, and in the few exceptional cases in which bronchoscopy fails, it is not likely that the patient can be helped by these cutting operations.

## CHAPTER VII.

### ESOPHAGOSCOPY.

*Historical.* The history of esophagoscopy shows that it is much older than direct laryngoscopy and bronchoscopy, and that the first successful attempts to pass an esophagoscope were due to the skill of laryngologists. This would seem to prove that those who are most familiar with the anatomy of the larynx and the upper end of the esophagus are best qualified to do such work. That the laryngologist by the constant manipulation of instruments in the larynx can do esophagoscopy best, there can be no doubt, though some profess to believe that the esophagus should be given to the stomach specialist. In 1870, Waldenburg succeeded in introducing a tubular mirror, 14 centimeters long, into the upper end of the esophagus and diagnosed a diverticulum. Two years before Semeleder and Stork had made unsuccessful attempts to see into the esophagus. Shortly after Waldenburg's experiments, Stork passed a long, straight tube into the esophagus and examined the entire organ for the first time. Some twelve years later, Mackenzie and Lowe tried unsuccessfully to get a view of the upper end of the esophagus with a skeleton esophagoscope, which ended in the pharynx. The Leiter-Nietze instrument was constructed with a series of prisms and an internal lamp. Experiments by Kussmaul and later by Mueller proved that a straight tube, 13 millimeters in diameter, could be passed into the esophagus of a normal individual; for illumination they used Desormeaux's apparatus. Kussmaul wrote no articles on his work and it would have passed into oblivion had it not been for Killian. In 1881, von Miculicz began to experiment with tubes at the instance of Leiter, who was a noted instrument maker in Vienna, and who was

familiar with Kussmaul's work in 1868. Miculicz had seen Stork use the esophagoscope and he combined the straight tube, originated by Stork with Leiter's illuminating apparatus, which consisted of an interior lamp of platinum wire with water cooling. To him must be given the credit of the first generally useful esophagoscope with which he examined the esophagus pathologically, physiologically, and anatomically. No one seems to have done anything worthy of mention with the esophagoscope after Miculicz until a number of years later, near the close of the last century. With modern esophagoscopy the names of Starck, Gottstein, Rosenheim, Kirstein, Killian, Brunings, and Guisez, in Europe, and Jackson, Mosher, Halstead, and others, in America, are linked. Jackson probably deserves more credit for the progress of esophagoscopy in this country than any other one man. His laryngoscopes are certainly among the best for the examination of the upper end of the esophagus, which ought always be done before passing the tube further down. The writer still uses Jackson's instruments as being the handiest he has seen. For some purposes a 12-millimeter tube is desirable, but for all average cases, the 10-millimeter tube answers all requirements. With it one can detect diverticula by working carefully, and this is probably the most difficult lesion to diagnose.

*Methods of examining the esophagus.* The writer will describe the different methods of examining the esophagus and will then refer to the straight method, which he has used for some time. A fair comparison of the methods will be made and the advantages of the straight method in examining the upper end of the esophagus will be pointed out.

The most important and the most difficult point in esophagoscopy is the examination of the upper end of the esophagus. At the level of the cricoid cartilage or the clavicle, foreign bodies usually lodge because these points are the narrowest in the esophagus; in children strictures will often be found here for the same reason. It is therefore very important to have some simple means of exposing these areas so that careful visual inspection will prevent possible injury to the walls, in the case of a tight stricture or a sharp foreign body, from pushing the esophagoscope down into the esophagus. With a long tube it is not possible to see the upper end of the esophagus. This is shown by the reports of skilled operators who have passed the long tube over a foreign body situated at the cricoid cartilage, and have made a prolonged and unnecessary search before finding it. While not de-



crying other well-known methods, the writer hopes to convince his readers that the all-important point, as in direct laryngoscopy, is the straight position of the head, especially in children. He believes it impossible to miss a foreign body at the upper end of the esophagus, and that the operation can be performed much more quickly and easily than by other methods. Upper esophagoscopy is easy in some individuals and very difficult in others. The principle of the examination depends upon the pulling forward or upward of the cricoid cartilage according as the patient is in the sitting or prone position, which with the proper instrument is more easily accomplished than with the large tubes generally used. The same objection to large tubes applies here as in direct laryngoscopy, and the same gentleness of touch is necessary. One can accomplish more with a small instrument both as to seeing and to operating with less pain to the patient. One of the essentials of successful tube work is to gain the confidence of the patient, and this cannot be done if one attempts to introduce a large tube and thereby causes pain. A smaller instrument properly manipulated cannot cause discomfort and this makes the examination easy. Mosher's method of exposing the upper end of the esophagus would be ideal if it could be used without general anesthesia. His "left lateral route" has been described under direct laryngoscopy and it is not necessary to repeat the description here. Suffice it to say that when it is carried out properly under deep general anesthesia, with the special spatula inserted into the esophagus, the upper end opens up as far as the clavicle. The use of a general anesthetic is a serious drawback in the average esophageal examination, especially in weak children or elderly adults with stricture. The only deaths the writer has had in tube work—two in number—could be directly attributed to ether anesthesia. One patient, 62 years of age, resisted all efforts at examination under local anesthesia; on account of a bronchial trouble, he was given a mixture of ether and chloroform by Dr. S. Griffith Davis, the most skilful anesthetic in Baltimore. He took the anesthetic badly, but finally quieted down so that the examination could be made. He was put to bed in good condition, but died suddenly at one o'clock A. M. It is safe to assume that if the patient had not taken ether, he would not have died. The other patient, 14 months old, was in bad shape from a lye stricture at the upper end of the esophagus. Before the writer saw the patient, a surgeon in attempting to diagnose and treat the stricture had given him ether three times. The stricture was

quickly found and dilated under slight ether anesthesia. The child did well for three days, at the end of which time he developed pneumonia, followed by a collection of fluid in the pleural cavity which resulted fatally on the tenth day. The chances are that this patient would have recovered if ether had not been administered at the last operation. This was the first stricture case treated by the writer; he never employs anesthesia in such cases now. His method of operating on strictures in young children will be described later. In young healthy adults, when properly given, ether is no more dangerous in tube work than in other surgical conditions. But the writer is convinced that one should never use general anesthesia in very young children or in elderly people if the esophageal examination can possibly be made without it. He feels confident that this can practically always be done with the improved technic of the present day. In examining the upper end of the esophagus in adults at the Presbyterian Hospital, the same method is used as proposed by Jackson with the slight modifications that the head is not thrown so far back and the instrument used is smaller and slightly longer than the one prescribed by him. In children the method differs materially from all others and will be described in detail.

*Examination of the esophagus with the patient sitting, under local anesthesia.* The patient is seated on a low chair with a high back rest, as in direct laryngoscopy. The back rest is a decided advantage because the patient assumes a comfortable position which is the proper position for the passage of the tubes. If desired, a movable head rest can be added and arranged to suit any position of the head. In the position to be described, the head is almost straight and is simply supported by a nurse. The pharynx is deadened with 20 per cent. alypin or novocain solution. The writer does not attempt the examination without anesthesia, as has been advised by Jackson. Alypin does no harm and it helps one to gain the confidence of the patient, since he knows that one is doing his best to make the examination easy for him. It is perfectly true that the esophagus is not sensitive, but patients are entitled to the same consideration that the operator would like to have under similar conditions. The writer is inclined to believe that not many laryngologists would be willing to submit to such an examination without local anesthesia. After waiting a few minutes the small modified laryngoscope which has been described above is passed between the left bicuspid teeth and pushed rapidly down to the left pyriform sinus. It is then an easy matter

to pull the cricoid cartilage forward and to expose the upper end of the esophagus. The only objection to the instrument is that the light is not bright enough to see far down. The DeZeng Company now has under process of construction a tube similar in shape to the modified speculum which will have their brilliant light at the end of it. With it one will be able to see far down in the esophagus or to the bifurcation of the trachea. Jackson's method differs from the above in that the head is further extended, since his large separable speculum is used. In his description the instrument is introduced between the incisor instead of the bicuspid teeth. In passing the large tube between the incisor teeth, it seemed to the writer that the patients complained more than was necessary for such a simple procedure. The outcome of this was the modified position of the head and the use of the smaller tube between the bicuspid teeth. After the examination of the upper end, if one wishes to explore the esophagus to the cardia, the large separable speculum is passed between the bicuspid teeth to the pyriform sinus. The 10-millimeter esophagoscope is then passed through the speculum, and when it reaches the sinus the cricoid cartilage is pulled forward and slight pressure on the esophagoscope coaxes it into the esophagus with a certain "give" as it passes the cartilage which is unmistakable. An assistant steadies the esophagoscope while the operator removes the speculum. Then, under the guidance of the eye, the esophagoscope is pushed further down and the walls of the esophagus examined. Certain operators advise larger tubes, but the writer has not found them absolutely necessary, and one is sure that with the 10-millimeter instrument no harm can be done if it is handled gently. The walls of the esophagus are thin and there is some danger of tearing them with the large tubes recommended by some operators. The writer has discarded the large separable speculum except as an aid in passing the large esophagoscope under local and general anesthesia. Practically all examinations of the esophagus at the Presbyterian Hospital are made under local anesthesia, and the method described above has been found very satisfactory.

The examination of adults under general anesthesia is made by Jackson with the head in the "Boyce position," which has been described above. With the head and shoulders over the end of the table and held by an assistant, the operator passes the separable speculum with the left hand and pushes it down behind the cricoid cartilage which is lifted by pulling on the instrument. The upper end of

the esophagus is thus exposed. In passing the esophagoscope Jackson uses the left index finger which is pushed down to the pyriform sinus or as far down as possible, as a guide, and slides the tube alongside of it until the instrument is in the sinus, when the larynx and the base of the tongue are forcibly lifted with the finger and the tube directed into the esophagus. This is a good method when one has long fingers, but with fingers as short as the writer's, it is almost impossible of accomplishment. Mosher sometimes uses very large esophagoscopes and claims that they make diagnosis and operative procedures easier. Occasionally the writer has passed the esophagoscope under local anesthesia with the patient in the prone position. The same method was used as in the sitting position, with the head over the end of the table. Brunings uses in the sitting position the same position of the patient as in direct laryngoscopy. He states that there has been much discussion as to whether examination can be better effected with the patient lying on his back or on his side. He gives the preference generally to lying on the left side. The dorsal position is especially indicated if the tube is to be introduced into the stomach. He speaks of the two methods of introducing the tube; in the "introduction by feel" a bougie is passed through the esophagoscope and the instrument is allowed to slip along the posterior pharyngeal wall near the middle line. If the end should stray into the sinus pyriformis in consequence of lateral deviation, it readily retains the middle line when the patient is told to swallow. It is possible to judge when the bougie has passed the entrance to the esophagus either by the sudden cessation of resistance or by the fact that the spatula tube almost disappears into the mouth. When this passage is accomplished, the second or straight act can take place. The patient bends his head further back, the tube is placed upright in a gap between the teeth, if such exists, or if the upper jaw is very prominent, into a corner of the mouth, the head being rotated to the other side. The surgeon rotates the tube gently, at the same time maintaining a moderate but steady downward pressure, and can feel a perceptible jerk when the sloping end of the tube overcomes any resistance. In the great majority of cases, by following these directions, even a beginner has no difficulty in introduction. A practiced hand can do it almost mechanically, and when he knows his bearings can use a little extra pressure, as lesions are seldom caused by a well-fitting mandrin. The tube spatula keeps in position, of itself, as soon as the lower end is 4 to 5 centimeters past

the esophageal orifice. The mandrin must therefore only be removed when the 22-centimeter tube projects beyond the upper row of teeth by one or two fingers' breadth. The withdrawal of the mandrin is effected by a rotary movement, the tube being held fast and slightly depressed. The electro-scope is then attached and ocular examination can begin.

*Ocular introduction of Brunings.* Brunings says that in view of the practical importance of introduction without a mandrin and the small attention which it has hitherto received, he thinks it advisable to dwell somewhat longer on the indications for it. The procedure is more difficult to carry out and is not intended to replace the mandrin in every case, but only when the latter involves direct dangers or fails to accomplish the object of esophagoscopy. He says that as a matter of fact the numerous foreign bodies treated in Killian's clinic in later years, and partly by beginners, were, with few exceptions, extracted through the tube spatula of his esophagoscope without using the inner tube. Only rarely, when the affection is known to be seated low, is the mandrin used. The method is more difficult and requires more skill than the mandrin method. The following procedure is the best: "After a thorough cocaineization (which includes the laryngeal surface of the epiglottis and root of the tongue), and with the manipulation described on page 101, the procedure is exactly the same as in medical autoscopia, and with a moderate degree of extension of the head the interarytenoid region is brought into view. There is here a final opportunity for defining the middle line by ascertaining the center of the posterior laryngeal wall as it moves on phonation. When this is seen the end of the spatula is raised somewhat, and passes behind the larynx. In this way the hypopharynx is reached, that region which is, according to von Hacker, "beyond laryngoscopy and not remote enough for esophagoscopy." For the sloping tube spatula such a region really does not exist. A moderate pressure with the wedge-shaped end suffices to dilate the hypopharynx into a short transversely placed fissure, on whose anterior shaped wall the lighter colored and often absolutely white surface of the cricoid plate is seen more or less distinctly. It is advisable always to exercise a certain displacing pressure forwards with the end of the tube, until the front cleft of the hypopharynx enters the middle of the field of vision. As the eye always anticipates the tube, the lip of the esophageal orifice can then frequently be seen projecting from behind, and appearing to present an unconquerable obstacle to further advance. For overcoming this obstacle the same

rules are applied as for the introduction with a mandrin—namely, correct position of the subject, no rigid bending of the neck, relaxed muscles, quiet breathing, and the patient waiting for reflex contraction to cease. Swallowing movements are found very helpful, but not all patients can accomplish them in this position. If even moderate increase of pressure does not push the tube past the physiological constriction, some further pressure, which is quite without danger if carefully followed by the eye, is unavoidable, because here dilatation and straightening occur simultaneously. The attainment of a successful result is often aided by the use of rotating movements, the sloping end of the tube then often taking a frontal and sagittal position, without, however, departing from the middle line. As soon as any doubts occur, it is better to go back and check the position by the symmetrical phonation movements of the arytenoid cartilages.

"The method of introduction without a mandrin appears much more complicated in description than is really the case. In the great majority of cases the esophageal orifice, when correctly presented, may certainly be expected to open on moderate pressure, and the tube to suddenly disappear without hindrance into the *pars cervicalis*. The wedge-like effect of the flat end of the tube is scarcely less than that of the blunt obturators of the esophagoscopes of von Miculicz and von Hacker.

"The ocular introduction of the tube is quite possible with the patient lying down, but the sitting position must be regarded as typical, especially when dealing with esophagoscopy above the bifurcation of the trachea. Children with whom general anesthesia has to be employed should be raised for the actual introduction. If for special reasons the lying position appears necessary, a successful result is best attained by adopting the left lateral position. Lying on the back must in any case be avoided."

Probably the most important part of esophagoscopy is the examination of adults under general anesthesia and the examination of children with and without anesthesia. Formerly the writer used the "Boyce position" in introducing the esophagoscope under general anesthesia. But the position left much to be desired, so he began to experiment with the straight position of the head in upper esophagoscopy, with the following results: In adults the position of the head is the same as for tracheo-bronchoscopy under ether, the patient lying on two cushions, one for the head, the other for the body. With the head straight on the table, the operator stands to the left and holds the instrument in the

left hand and passes it between the bicuspid teeth, pushing it rapidly down behind the larynx. When the tube is well down the cricoid cartilage is forcibly pulled up, exposing the upper end of the esophagus. The procedure is easy, but is not often resorted to because nearly all patients are successfully examined in the sitting position under local anesthesia. The small speculum is long enough to insert into the upper end of the esophagus if necessary. If, after examining the upper end, it is desired to explore the esophagus proper, the cushion under the head is removed and the head allowed to fall to the plane of the table. The large separable speculum is now passed between the left bicuspid teeth and pushed rapidly down until the left pyriform sinus comes into view. In this maneuver the operator stands to the left and holds the instrument in the left hand. When the sinus is seen, the 10-millimeter esophagoscope is passed through the speculum and at the instant that the larynx is pulled up with the short tube, the long tube is gently pushed into the esophagus. The separable speculum is then removed, the operator takes his seat at the end of the table and proceeds with the examination under the guidance of the eye. If the right thickness of the cushions has been chosen, very little movement of the head is necessary to explore the esophagus. As in tracheo-bronchoscopy one is surprised how little extension of the head is needed for successful work.

The examination of the upper end of the esophagus in children is very simple. As in direct laryngoscopy no anesthetic is used. The little patient is wrapped in a sheet which is so pinned that the arms and legs are practically immovable. The head lies straight on the table and is held by an assistant who is entirely out of the way of the operator, who stands to the left of the table and passes the small tube with the left hand between the incisor or bicuspid teeth and pushes it down back of the larynx with little force. The cricoid cartilage is now raised by pulling slightly on the laryngoscope and the upper end of the esophagus exposed. Strictures and foreign bodies are easily and quickly diagnosed and treatment carried out in the same position. If it is necessary to examine the esophagus further down, the small separable speculum is passed in the middle line, the 7-millimeter esophagoscope pushed down through it, the speculum removed and the esophagus easily examined with the head slightly extended. The operator manipulates the instruments from the left side of the table. The ease with which the upper end of the esophagus is examined with the head straight is really remarkable. In a few seconds the diagnosis is made and

the child is unhurt. Sometimes with a struggling child, an abrasion of the membrane occurs, but this also happens under general anesthesia occasionally. It is by far the simplest method of examining children. The writer extracts all foreign bodies with the head in this position and its advantages will be clearly shown under this heading.

Another method of examining the upper end of the esophagus in children is to pass the tubes with the head in the "Boyce position," but it is so much more difficult than the straight position that the writer simply mentions it by way of comparison. Mosher's method is valuable in certain cases, but it is hardly necessary to go through such a complicated procedure when the straight method is so much easier. For these examinations of the upper end of the esophagus, no instrument is equal to the modified Jackson laryngoscope, which is large enough to see and to work through. In the opinion of the writer the electroscope of Brunings is less valuable because the visual field is not as large.

After the esophagoscope passes the narrow upper end of the esophagus, the remainder of the examination is usually easy. The upper part of the esophagus—the so-called cervical portion—is transverse in character with its walls in contact for about three inches and this part can be clearly distinguished from the so-called dorsal portion which is oval in shape and appears open to the esophagoscope so that one can see some distance down into the esophagus through it. Just as soon as the cervical part is passed, the mucus membrane is no longer pushed aside by the advancing tube, but the esophagus itself opens up as if to receive the instrument. At each inspiration the esophagus widens and in ordinary examinations it is always well to have the patient take deep inspirations. At the bifurcation of the bronchi, there is a slight constriction which is easily passed; in the region of the aorta, its pulsations are recognized, and often are communicated to the tube. Just below these constrictions the instrument passes into a wide lumen which gradually curves to the opening through the diaphragm. In this region it is well to have the esophagoscope in the right side of the mouth so that by pressing the end to the left, the curve of the esophagus can be easily followed and the tube prevented from catching against the right wall of the lumen, which would happen if the instrument were pushed down straight. The diaphragmatic contraction is usually represented by a narrow cleft which runs from the left side anterior to the right side posterior. In some patients the opening is shaped more like a rosette. Passing the diaphragm is probably the most difficult part of

esophagoscopy; after it is passed the cardia is sometimes missed because the tube easily slips into the stomach, the dark pink membrane of which is distinguished from the membrane of the esophagus which is pale or about the color of the membrane of the cheek. In withdrawing the tube the entire lumen can again be inspected by a slow withdrawal which allows better inspection of certain parts, notably the cardia and the cervical portion. The farther down the tube is passed, the more trouble there is from secretion and regurgitation of food from the stomach. In all cases examined under local anesthesia this constitutes a troublesome problem. At the Presbyterian Hospital a water pump was always used to get rid of the secretion; in most cases applicators must be used freely. Usually there is not much trouble in introducing the esophagoscope under local anesthesia, especially if a hypodermatic injection of morphine and atropine is given beforehand. It is better to attempt the examination on an empty stomach, though this is not always possible. The writer has found that constant encouragement of the patient by assurances that all is well helps materially in esophagoscopy and tracheo-bronchoscopy. The second examination is always easier than the first, especially if the patient has suffered no pain at the first trial. The introduction of the esophagoscope is generally considered easier than tracheo-bronchoscopy, but with the writer the latter has always been easier of performance because he can work with more confidence when he sees exactly what he is doing. The American methods of introducing the esophagoscope must all be considered more or less blind in that the tube is passed by touch and not by sight. However, with ordinary care there is little danger of doing harm in passing the tube. As in tracheo-bronchoscopy the operator's watchword must be gentleness; the walls of the esophagus are thin and may be torn by rough manipulation. Most of the fatalities in foreign body extractions have been caused by rough handling of instruments or the esophagoscope has been pushed through a wall weakened by a malignant growth. If one is careful it is almost impossible for such an accident to happen. In passing the esophagoscope into the esophagus and into the stomach, a certain amount of pressure may be used to overcome resistance, but the force used must be carefully gauged.

*Indications for esophagoscopy.* The writer is so partial to careful esophagoscopy that he believes it should be used as a routine measure in every foreign body case. In an article published last year by a prominent esophagoscopist, the following state-

ment is made: "Although the esophagoscope has greatly aided in the management of impacted foreign bodies in the esophagus, it has not and cannot entirely supplant the older methods. There are not a few cases in which the time-honored methods of operating are simpler, easier and quite as effective as esophagoscopy." He then describes the removal of common pins and fish bones with the old bristle bougie which he describes as an instrument than which none is more generally useful and effective and which can be employed with almost perfect safety. He also says that for the removal of coins and buttons often nothing is better than the old, bent esophageal forceps or a straight, smooth, blunt-pointed and toothless 8-inch hemostat. He then cites several foreign bodies in the upper end of the esophagus which he failed to locate for a long time with the ordinary esophagoscope because the instrument repeatedly slipped over the object. After what has been said above, it is unnecessary for the writer to express his disapproval of such views. To him it is clearly obvious that a short, wide esophagoscope in the hands of a skilful operator is far superior to blind groping with any kind of forceps or bougie. The writer has never failed to locate and remove a foreign body within a few minutes with the method referred to above and he believes that success has been due to the straight position of the head with almost complete muscular relaxation and the use of the short esophagoscope with which it is impossible to miss seeing the foreign body. In an article by another contemporary on the difficulties of upper esophagoscopy, reference is made to the value of the short tube in searching for foreign bodies as if the procedure were new. Jackson, in his book which was published in 1896, refers to the value of the short tube and advises its use in every examination of the esophagus as a valuable means of obtaining information about the upper end. In 1908, in an article in the *New York Medical Journal*, the writer emphasized the value of the short tube in the removal of foreign bodies from the upper end of the esophagus. The adoption of the straight method has made the use of the short tube much more valuable in the greater ease of manipulation and in shortening materially the time taken in the removal of foreign bodies.

Another indication for the use of the esophagoscope is any difficulty in swallowing or in patients who complain frequently of the so-called "globus hystericus." Benign strictures of the esophagus always require the assistance of esophagoscopy as do malignant growths. The treatment of these con-

ditions will be taken up later. Spasmodic conditions of the esophagus will often require the introduction of the esophagoscope both for diagnosis and treatment.

*Contraindications for esophagoscopy.* These are the same as for tracheo-bronchoscopy, viz., advanced heart disease, arteriosclerosis if in an advanced stage, and extreme weakness. In cases of total obstruction the writer does not allow great weakness to deter him from passing the esophagoscope for the purpose of dilating the stricture. In aneurysm, esophagoscopy must be done with great care, and in most cases it is better to dispense with the examination unless the patient is completely stopped up.

*Dangers of esophagoscopy.* These have been emphasized above; the writer does not consider esophagoscopy dangerous in the hands of a careful operator. The most dangerous points in the esophagus are the upper end and the opening through the diaphragm and careful manipulation of the tube practically removes the danger of rupture at these points. As has been emphasized above, the greatest danger is in the rough or hasty manipulation of the tube. In all tube work one must see what he is doing; the tube must not be advanced until one is convinced that he has a clear field before him. In curvature of the spine it may be impossible to pass the tube; if one succeeds he must work very carefully in introducing the instrument.

## CHAPTER VIII.

### DISEASES AMENABLE TO TREATMENT THROUGH THE ESOPHAGOSCOPE.

*Acute esophagitis.* The esophagoscope should never be passed in acute esophagitis unless one knows that a foreign body is present or is suspicious that such is the case, for instrumentations will only make the inflammatory condition worse. One who has seen the worst type of esophageal inflammation with the intense suffering to the patient will hesitate to add to the distress unless it is absolutely necessary. In the removal of foreign bodies the esophagoscope has given the opportunity to study the changes in acute esophagitis. Some years ago a lady was brought to the writer with the history of having swallowed a large oyster. She had fever and pain on swallowing and was prostrated. Since no food would go down, she was examined under ether to find out if the oyster was sticking in the upper end of the esophagus. Jackson's separable speculum was passed and the upper end of the esophagus exposed; the mucus membrane was enormously swollen, reddened, and edematous, and in place streaked with blood. The

oyster had evidently passed down; the esophagus had probably been scratched by a piece of shell which had set up the severe inflammation. Treatment was practically confined to the use of ice internally and externally, with hypodermic injections of morphine to relieve pain, which was intense. For several days the efforts to swallow were agonizing and it looked as if the patient would starve. Emaciation was extreme. When her condition seemed critical, some improvement in swallowing was noted and the pain disappeared rapidly. The patient immediately began to increase in weight and in about two weeks was able to return to her home in South Carolina. Such a condition can be brought about in foreign body cases by the careless use of forceps and bougies, and the membrane may be so torn that a fatal issue is the result even after the object is removed. Acute inflammation by its swelling greatly increases the difficulties of removing foreign bodies. The writer has seen several cases of slight acute esophagitis from swallowing small bones. The changes in the membrane are not marked; there is usually increased redness with or without some swelling. The chief complaint of the patient is a painful or sticking sensation in the upper part of the esophagus which may or may not radiate to the back. Such cases always yield to ice applications and cold milk as diet. The writer has seen the scratch in the membrane on two occasions. In his earlier experience he was inclined to subject these patients to an examination; of late years, if the pain is not severe and the temperature is not elevated, he contents himself with attempts to find out from the patient the size of the bone, and, if it is small, he does not make an examination in the beginning. If the symptoms grow worse, which is seldom the case, the esophagoscope is passed to be sure that the foreign body is not present.

*Strictures of the esophagus.* The safest and best treatment of strictures is through the esophagoscope. The old method, which is still persisted in by some, of forcing stiff bougies through a stricture, is a dangerous one, because often the stricture is so dense that the bougie can easily slip away from it to the esophageal wall, and undue force here is liable to perforate with fatal mediastinitis as the result. In some cases there are a series—two or more strictures—and, if, perchance, the stiff instrument passes through the first one safely, there is still another chance for perforation. There is no way of estimating how many deaths have been caused from the blind use of bougies. Now that esophagoscopy is so safe and so sure in the treatment of benign strictures, it does look as if the



bougie will be used in the future only for mercenary purposes. The treatment which has proven highly satisfactory to the writer is that proposed by Jackson in his book on esophagoscopy. In adults the treatment is usually carried out under local anesthesia; in young children without anesthesia, and in older children it is generally necessary to use ether. In adults after the stricture has been diagnosed through the 10-millimeter tube, the smallest Bunt bougie is passed through the esophagoscope and the tiny opening looked for. In some cases this is difficult to find, but with patience and perseverance the search is successful. The Bunt bougie has two olive tips, the distal one measuring one millimeter in all six sizes, while the proximal one gradually increases in size. The distal tip is always used as a guide, and after it passes through the stricture, force may safely be exerted on the large olive for dilating purposes. The next size is then pushed through and then the third size. By this time an 8-millimeter opening has been obtained; this constitutes the first treatment. In most cases a second sitting is necessary a few days later when the same bougies are used and immediately followed by a small French bougie which is made of fiber and wax covered with shellac. The advantage of such an instrument is the fact that it can do no harm since it is not stiff like the whalebone bougies, and will double on itself before penetrating the esophageal wall. It usually passes through the 8-millimeter opening with ease. The stricture is now under control and all that is necessary in most cases is to pass the soft bougie every few days for a time and then to use a larger French instrument. When the bougie of sufficient size passes easily, the patient is instructed in its use and allowed to go home, where he carries out treatment every week in the beginning; after a time it will be necessary to repeat treatment every two weeks, and finally passing the instrument every six months will be sufficient to keep the stricture open. Treatment in children is the same except that the first and second Bunt bougies are used. With the exception of some pain for a few days after the first treatment no bad results have been noted in a number of stricture cases treated during the last few years. It has always seemed to the writer that dilating strictures by forcible divulsion is dangerous, since one cannot tell absolutely how much force is being used. Not long ago an experienced esophagoscopist told the writer of a death in his practice one week after the forcible divulsion of a stricture near the cardia. No treatment could be safer than that described above; the bougies are

all numbered and one can tell exactly what the dilatation will be.

Strictures of the esophagus may be classified as traumatic, ulcerative, corrosive, tubercular, syphilitic, and malignant.

Traumatic strictures are usually caused by the careless or rough use of instruments in the removal of foreign bodies; such cases not infrequently are fatal before the stricture has time to form. The writer has never seen such a case, he having had the good fortune to get all his foreign body cases before any effort had been made at removal.

Ulcerative strictures are not uncommon. The writer has seen two such cases, both strictures being near the cardia, the result probably of the so-called peptic ulcer of the esophagus. Some years ago a woman, 27 years old, was referred to the writer with a history of not having swallowed solid food for two years. Her trouble dated back to an attack of typhoid fever; during convalescence she suffered from periodic attacks of severe pain in the region of the cardia, especially on eating solid food. She noticed that swallowing gradually became more difficult until finally only liquids passed into the stomach. She had lived on milk and ice cream for two years. Under local anesthesia the 10-millimeter esophagoscope was passed and the stricture located just above the cardia; it was dilated with the Bunt bougies, and, aside from some pain, the patient suffered no discomfort. In two weeks she returned to her home in Brunswick, Maryland. She passes a French bougie every six months and is practically well. She wrote the writer some time ago that she swallows all foods except grapes without difficulty.

Corrosive strictures are the most common because of the frequency with which children drink a solution of lye. The first effect is a severe inflammation of the esophagus, which gradually heals with the formation of scar tissue, the contraction of which gives rise to the stricture. About three years ago the writer saw a little boy who drank lye when he was only 19 months old. His parents took him to Dr. Chevalier Jackson, who examined him and found ulcerations at the upper end of the esophagus. He advised expectant treatment for the cure of the acute condition and then the radical dilatation of the stricture which was sure to form. The patient gradually recovered and the esophagus closed, as was expected. For months before the writer saw him, his mother had to spend several hours daily feeding him, since most of the milk was promptly regurgitated. He finally closed entirely and he was hurried to Baltimore to see Dr.

J. C. Bloodgood, who referred him to the writer for treatment. Under ether anesthesia the 7-millimeter esophagoscope was passed and the stricture located two inches above the cardia. There was no narrowing at the upper end of the esophagus. The stricture was quickly dilated and a small, soft bougie was passed immediately. The little patient had a rather severe reaction, but made a good recovery, and in two weeks was allowed to go to his home in West Virginia to be under the care of his uncle, who is a physician.

An interesting case which shows how little esophagoscopy is known, or, if known, how little appreciated by the general surgeon, was that of a boy, 10 years old, who swallowed lye when he was 19 months old. A stricture formed and he was placed in the hands of a general surgeon, who passed bougies for years. When the writer saw the boy three years ago, he had never swallowed solid food, having lived all his life on milk and strained soups. If, perchance, a small piece of bread or rice happened to reach the esophagus, there was immediately a spasm, which sometimes brought on convulsions, and a hypodermatic injection of morphine would have to be given to put him to sleep, after which he would be ready to drink again. He was a source of great care to his mother, who had to strain his food carefully. He was not allowed to go to picnics with his little playmates because he could not eat. Under ether anesthesia the 7-millimeter esophagoscope was passed and the stricture located above the cardia. It was successfully dilated and in a short time the boy was eating everything. The writer was interested to see how his stomach would act after so long a diet of liquids: from the first he had no trouble with his digestion. Many things which he had craved during his enforced fast were distasteful to him when he tasted them. With the passage of the bougie every few months, which he does himself, he has remained well. In the experience of the writer corrosive strictures are more frequent near the cardia than at the upper end of the esophagus, which differs from the observations of some other men. It looks as if strictures at the upper end of the esophagus ought to be more common since this is the narrowest part of the lumen, and the escharotic can exert its full effect here.

*Tubercular strictures.* The writer has seen one case of this rare condition and it happened to be the first stricture in his experience. The patient was a male, 44 years old, an ex-prize fighter, who came to the Presbyterian Hospital complaining of difficulty in swallowing solid food. Examination

with the 10-millimeter esophagoscope revealed a large ulcerating mass 8 inches from the upper teeth, which looked like a malignant growth. Since the patient had been a hard drinker for years, and no signs of syphilis could be found, a diagnosis of malignancy was made. The stricture was dilated from time to time and the patient was made comfortable for six months, at the end of which time he died. A month before his death he developed numerous râles over both lungs. At the autopsy the diseased portion of the esophagus was removed for more careful examination. The patient died of an acute miliary tuberculosis. Microscopic sections from the esophagus showed that the tumor was tubercular and not malignant. Specimens removed through the esophagoscope would have made the diagnosis much earlier. This case teaches that one can never be certain of diagnosis through the esophagoscope, and it is always better to remove specimens for microscopic examination.

*Syphilitic strictures.* Syphilitic lesions in the esophagus are rarely seen. Some observers go so far as to say that they never occur. Some years ago a colored woman, 25 years old, came to the dispensary of the Presbyterian Hospital complaining of difficulty in swallowing. After local anesthesia she was examined with the large separable speculum. Just below the cricoid cartilage a large, reddish, granular mass, resembling an ulcerative epithelioma, was seen. Since the patient was only 25 years old and had had her trouble a comparatively short time, a probable diagnosis of gumma was made. The diagnosis was rendered more probable by the unmistakable signs of syphilis in other parts of the body. The patient was given increasing doses of iodide of potash and the tumor gradually disappeared. The patient was watched for some time after the gumma had healed and except for a slight narrowing of the esophagus which did not interfere with swallowing there were no bad results.

*Malignant strictures of the esophagus.* Cancer of the esophagus forms one of the darkest chapters in the history of medicine. Until the introduction of the esophagoscope, such cases were treated by making a hole in the stomach for sustaining life as long as possible. Thanks to the tube it is now possible to dilate such strictures and to give the patient the pleasure of tasting what he eats. Some authorities are opposed to the dilatation of malignant strictures, claiming that the growth of the cancer is thereby stimulated and death hastened. If one watches such a patient throughout his illness, as the writer has repeatedly done, it will not

be necessary to refute the above argument. It may not be the best surgery, but the writer feels that he has prolonged and made the patient's life more comfortable in many cases by adopting the same treatment as in benign strictures. One who has seen a poor miserable wretch straggle into a hospital, unable to swallow except by the most painful efforts, and even then not enough liquid to sustain life, and has seen him beg for water to cool his parched lips, and, after dilatation through the esophagoscope, has seen him swallow liquids easily and has heard his words of gratitude, will care little about the increased growth of the cancer. Good results are gotten in all cases of cancer by dilating through the esophagoscope or by using the string method. The writer has repeatedly seen patients swallow to the very end of life by the occasional dilatation of cancerous strictures. He believes thoroughly in the treatment and uses it in every case. Since the manner of dilatation is the same as for benign strictures, no cases will be cited. The history of one patient who was successfully dilated by the string method after the esophagoscope had failed will be referred to briefly. The patient was a man, 55 years old, who came to the Presbyterian hospital with the usual history of difficult deglutition even with liquids. The esophagoscope showed a malignant growth about three inches above the cardia. After a long search the stricture was found, but it was not possible to dilate it. After several attempts at dilatation had been made, the patient was given three yards of silk with instructions to swallow it. With the small quantity of milk that was passing through the stricture, the silk in a few days was reduced to a yard. The flexible bougie was now threaded on the silk, the smallest tip being used. Since the silk acted as a guide, one could feel comparatively safe in using some force to push the bougie through, which was done. Larger tips were then threaded on the silk and the operation repeated until the patient could swallow liquids easily. After this start there was no trouble in passing from time to time a French bougie which kept the stricture open until the patient died. The writer is convinced that any stricture can be dilated successfully by one of the above methods, which, when used properly, will prevent gastrostomy in every case. In cancerous cases the latter procedure may be preferable, since the silk finds its way into the stomach in every case and the bougie being flexible always follows the silk. In such a procedure there can be no danger of making a false passage into the mediastinum as might possibly happen with a stiff instrument. In

cancer which is ulcerating the walls of the esophagus are already weakened, and one must proceed with caution.

*Diverticulum of the esophagus.* This condition is rare and is difficult to diagnose. Some time ago a man, 54 years old, was referred to the writer with the history of trouble in deglutition of five years' duration. His trouble was peculiar in that food which had been swallowed twenty-four hours before would come up entirely undigested and almost in its original state. The continuous lack of nourishment pulled him down from a strong healthy man to a mere shadow. At times pain was severe. Before the examination he was given morphine and hyoscine hypodermically. The esophagoscope was easily passed and nothing abnormal found until the region of the cardia was reached. Here two distinct openings were seen, one of which to the left led into a pocket two or three inches in length, which was filled with milk and undigested food. After pumping the pocket out the mucus membrane could be seen. To the right the tube entered the cardia and passed into the stomach, the mucus membrane of which was easily recognized. To enter the diverticulum the upper end of the esophagoscope had to be carried far to right. When the pocket was emptied, the walls immediately collapsed so that the opening was difficult to find. The patient was so weak that no surgical treatment was advised.

*Esophagismus.* In nervous spasm of the esophagus causing inability to swallow, the diagnosis is easily made by passing the esophagoscope under deep general anesthesia. Sometimes the diagnosis can be made by giving hyoscine and morphine hypodermically, which, by relaxing the muscles, allows the tube to pass. A patient seen some time ago complained that he could not swallow at times. After he would masticate his food and, on attempting to swallow, would become black in the face and would be compelled to leave the table to relieve himself of the bolus of food. He was a young man and could do his work without trouble. The queer attacks at the table alarmed his family. Hyoscine and morphine hypodermically and alpin locally caused relaxation of the muscles so that the esophagoscope was easily passed. Nothing abnormal was found; the patient was given antispasmodics and a French bougie was passed a few times and left in for some minutes so as to make the procedure as disagreeable as possible. The attacks gradually disappeared and in a few weeks the patient was entirely well.

*Cardiospasm.* This is an exaggerated form of

esophagismus which is much more serious because in many cases treatment seems to do little or no good and the patient is reduced to extreme weakness from lack of nourishment. The diagnosis is made by passing the esophagoscope under deep general anesthesia, which relaxes the spasm and allows the tube to slip easily into the stomach. The condition simulates an organic stricture in that soft stomach tubes and bougies fail to reach the stomach. Unfortunately, treatment does not seem to accomplish much. Plummer has devised a dilator which is placed in the cardia as a flat bag. When water is pumped into the bag, it swells and so dilates, but the dilatation is not often permanent. The patient promptly relapses and the dilatation has to be repeated. Some weeks ago a man came to the University Hospital with the history of having swallowed almost nothing for three weeks. He had had trouble for a long time; there were times when he could swallow with little difficulty. But for three weeks he had vomited constantly. Repeated attempts to pass a stomach tube had failed. Under ether anesthesia the esophagoscope was passed and the walls of the esophagus examined without finding anything abnormal. The tube was then passed into the stomach without difficulty, thus making the diagnosis of cardiospasm. Under this heading the writer wishes to speak of the hypodermic injection of morphine and hyoscine as an anesthetic in esophageal work. If given in the dose of morphine (1/8 gr.) and hyoscine (1/200 gr.) an hour and repeated half hour before the examination, it acts as a reliable anesthetic in most cases, so that practically no local anesthetic has to be used. Some laryngologists oppose its use; in the writer's cases it has acted as a safe and reliable anesthetic.

*Foreign bodies in the esophagus.* In the enthusiasm over the removal of foreign bodies through the esophagoscope, one is apt to overlook the usefulness of the instrument in other conditions. For this reason it seemed to the writer that the treatment of other conditions at some length would not be amiss in a work of this kind. There is perhaps nothing more spectacular in the entire domain of medicine than the quick and skilful removal of a foreign body from the esophagus or bronchi through the tube. On the contrary there is nothing more humiliating than to see one attempt to remove a foreign body without some previous experience in tube work. It therefore behooves everyone to practice sufficiently on the dummy and on animals before attempting the work on the human being. In a conversation with a leading local

laryngologist, the writer was told that a friend had borrowed his tubes to practice on a patient whom he had the resident physician keep asleep two hours while he blundered about in the bronchial tubes. The result was that the resident had to sit by the patient all night and stimulate him often for fear that he would die. Such things are deplorable, but will continue to happen until laryngologists realize that this work requires more practice than any other branch of medicine if one would learn to do it well. Such incidents bring the method into disrepute and delay its recognition by the general profession. There is no work capable of doing so much good if well done, and fraught with so much danger if badly done.

At the risk of being accused of repetition the writer wishes to bring out some points which have been mentioned above in order to emphasize them as being very important to all beginners in esophagoscopy. These points are taken from an article on "The Removal of Foreign Bodies from the Upper End of the Esophagus," which was read before the American Academy of Ophthalmology and Oto-Laryngology in August, 1912, and which attracted much attention because the writer advocated a position of the head radically different from all other positions of the head used in this country or in Europe. The article in substance is as follows: The upper end of the esophagus is that part included between the clavicle below and the cricoid cartilage above. In this area foreign bodies usually lodge because at these points the esophagus is narrowest. It may be said that the removal of foreign bodies is practically limited to this area, meaning about an inch and a half in length. Foreign bodies, especially if flat, lodge in the esophagus with edges transverse; as a rule they are located back of the middle line, which accounts for the fact that an ordinary esophagoscope sometimes slips over the anterior plane and the entire esophagus is examined without finding the object. Such cases have been reported by skilled operators. The method of throwing the head over the end of the table, thus causing tense muscles, probably has something to do with not finding the foreign body at once. The writer long ago discarded extension of the head in examining the upper end of the esophagus. He is convinced that relaxation of the muscle is the most important point in the examination, and this can be obtained only with the patient's head practically straight on the table. The elasticity of the tissues allows great freedom of movement and, by manipulation of the instrument, the right angle of the throat become straight. It is

then easy to seize the foreign body and remove it. One who has tried extension of the head with its many difficulties and then turns to the straight position will immediately perceive the many advantages of the latter position. There are operators who are skilled in extension, but they have become so by long experience.

*Methods of examining the esophagus.* 1. Extension. This method has reached a high state of perfection through the work of Dr. Chevalier Jackson and Dr. J. W. Boyce, who have developed a method of holding the head known as the "Boyce position." Jackson emphasizes the fact that the head must be held just right, which necessitates a trained assistant. In this method the head and shoulders are pulled over the end of the table and held by an assistant. The objections to extension are the tenseness of the neck muscles, which must be overcome by pulling, and the position of the instrument, which must be suspended in the air with the left hand and which cannot be long held because of the strain on the forearm. For these reasons a simpler method is to be preferred. 2. Flexion. This method was worked out by Dr. H. P. Mosher in 1908. Under general anesthesia the patient's head is turned to the left until the cheek almost touches the plane of the table and then flexed on the chest. The operator sits at the left facing the head and introduces a special spatula between the left bicuspid teeth. The tongue is pushed to the opposite side and the cricoid cartilage lifted, which exposes the upper end of the esophagus to the clavicle. So far as the writer knows this method cannot be used without general anesthesia, which exposes the patient to unnecessary risk. This objection does not apply to extension in which the patient's head can be forcibly held over the end of the table. It is, however, more difficult to hold the head than in the position which will now be described. All that has been said above applies to children, since a satisfactory examination can nearly always be made in adults under local anesthesia, with the patient sitting. 3. Straight position. This position of the head is the same as the straight position of direct laryngoscopy, which the writer worked out in 1908. In this method the head lies straight on the table. In children up to 6 years of age no anesthetic is used. Cocaine is dangerous in children, and since the method is designed to make esophagoscopy simple and practically free from danger, ether is not used. Only in rare cases is a general anesthetic necessary and almost never in children. The little patient, securely pinned in a sheet, is placed on the table. The head is held by an assistant while the

arms and legs are attended to by nurses. Jackson's old child speculum is introduced between the incisor teeth and pushed rapidly down behind the larynx, which is gently lifted, exposing the upper end of the esophagus. The instrument may be pushed below the cricoid cartilage if desired. Since the speculum has a diameter greater than the average esophagoscope, used in children, one sees better through it. Because of the relaxed muscles and the position of the instrument downward and slightly backward, thus exposing the posterior part of the esophagus, it is practically impossible to miss a foreign body. For the benefit of those who prefer Brunings' electroscope, the writer has had tubes made by Mueller and Co. which expose the upper end of the esophagus satisfactorily. For this method no special assistants are required. Esophagoscopy can be done anywhere because the operator needs only nurses to hold the head and arms. From the writer's experience he believes all foreign bodies can be removed through the esophagoscope.

To illustrate the improved technic in the removal of foreign bodies, a few cases will be cited. Some years ago when the writer was following methods suggested by other operators, a little girl was brought to St. Joseph's Hospital with the history of having swallowed a lead disc the size of a five-cent piece. She picked the disc up from the pavement. The x-ray showed the foreign body at the cricoid cartilage. Ether was administered and Jackson's small speculum introduced with the head over the end of the table. The foreign body was successfully removed. This was one of the writer's first cases and is cited for the purpose of comparison with the improved technic which he uses now.

In February, 1912, a little girl, 2 years old, was referred to me by Dr. J. J. Carroll, with the history of having swallowed a five-cent piece one week previously. She could swallow liquid nourishment only. The x-ray picture showed the coin at the cricoid cartilage. The patient was taken to St. Joseph's Hospital for operation. That afternoon she was pinned in a sheet and placed on the table with the head straight and held by a nurse. No anesthetic was used. The small, short tube was passed between the incisor teeth and pushed rapidly down behind the larynx, which was lifted, and the upper end of the esophagus exposed to view. The foreign body was immediately seen just below the cricoid cartilage and somewhat back of the middle line with the edges transverse. Brunings' extensible forceps were introduced through the tube, the coin seized and promptly removed. The entire proced-

ure did not take two minutes. The child did not have time to cry and left the table unhurt. In this case there was no abrasion of the mucus membrane.

In September, 1912, the writer was asked by a physician to see his little daughter, who, a week previously, had swallowed a penny. The father, thinking that the foreign body would pass through, paid no special attention to the incident until the mother noticed that the little patient was having difficulty in swallowing, and that she would awake several times at night fretting with pain in her throat. He then had x-ray pictures made, which showed a shadow at about the seventh cervical vertebra or at the upper end of the esophagus. The patient was taken to the University Hospital, where she was immediately prepared for operation. The preparation in these cases is very simple. The patient is taken to the operating room in her street clothes and wrapped in a sheet which is securely pinned so as to reduce movements of the arms and legs to a minimum. She is then placed on the table with the head straight and not over the end of the table. An assistant holds the head while the arms and legs are attended to by nurses. No anesthetic is used; this point cannot be too strongly emphasized, since cocaine is dangerous and ether is unnecessary, except possibly in those cases in which the foreign body has sharp edges or happens to be a pin. The patient was placed on the table as above described with the head held straight. The writer's modification of Jackson's child laryngoscope was passed; this tube measures 17 centimeters in length and 10-millimeters in the inside diameter. When the larynx was reached the spatula end of the tube was hooked around the cricoid cartilage, which was easily raised, and the upper end of the esophagus exposed. The penny was immediately seen lying posterior to the middle line with the edges transverse. Forceps were introduced through the tube, the coin seized and removed. The entire procedure took about two minutes. The little patient was not hurt, the membrane was not injured, and ten minutes after the operation she was taken home in her father's automobile. She made an uneventful recovery. This case has been described in detail to emphasize the value of the straight position of the head and the advantage of using a short instrument in upper esophagoscopy.

A short time ago a boy, 14 months old, was brought to the Presbyterian Hospital with the history of having swallowed a piece of St. John's bread that morning. A physician was called, who resorted to the usual procedure of putting his finger in the child's throat to remove the foreign body,

with the almost invariable result of pushing it further down into the introitus esophagi. Right here it may be well to emphasize the danger of such a procedure, especially if the foreign body is a pin or has sharp edges. The writer knows of one case in which the physician pushed an open safety pin so far down in the esophagus that it could not be seen with the short tube. Fortunately, it did no harm, but it might have resulted seriously. The boy had not been able to nurse all day. He was pinned in a sheet and placed on the table with the head straight. The writer's tube, attached to Brunings' electroscope, was introduced and the foreign body was located with difficulty. While the electroscope gives a good light, the writer prefers the Jackson tube for exposing the upper end of the esophagus because it is more easily handled. The foreign body was so tightly wedged in the esophagus that only by using considerable force with Pfau's forceps could it be dislodged and removed. The stem end of the object went down first.

In December, 1912, a child, 8 months old, was referred to the writer with the history of having swallowed a safety pin. The patient was examined at the Presbyterian Hospital with the head straight on the table. The small tube was passed and the pin immediately came into view in the upper end of the esophagus, with the point open and to the left, sticking in the wall of the esophagus. Instead of closing the pin, the writer tried what he thinks is a simple method of removing it. With the forceps the point was detached from the wall and pulled up into the tube, which was then carried as far to the left as possible; careful manipulation of the instruments caused the body of the pin to slide along the right wall of the esophagus until it passed the introitus, when all the instruments were quickly removed. The removal was successful and the writer is inclined to think that the method will work in the majority of cases. Practically the only danger of injury to the esophageal wall is from the point of the pin; since the body is comparatively smooth, careful manipulation of it will withdraw it in safety.

An interesting case which shows how some foreign bodies will remove themselves in spite of the esophagoscope was that of a child, 6 months old, who, according to the mother's story, was supposed to have swallowed a safety pin. The history was that the mother had a safety pin sticking in her dress with the child's head over her shoulder. Suddenly the child choked and coughed, and when the mother looked for the pin it was gone. She naturally concluded that the child had gotten the pin



and swallowed it. The family physician ran his finger down the throat and thought he felt the pin, but was not at all sure of it. With this indefinite history, the patient was brought to the writer. The child was breathing well and seemed in good condition, so it was decided to make an examination of the upper end of the esophagus, since the pin, if present, would most likely be there. On passing the tube with the head straight nothing was found. The mother was advised to have an x-ray picture made the next morning and, if the pin was found, to bring the child back for removal. On returning home she looked on the floor and found a pin which she felt sure was the one the child was supposed to have swallowed. As a result the picture was not taken. The child seemed perfectly well; a few days later the mother found the open safety pin sticking out of the anus. It was removed without difficulty. The child apparently was at no time affected in the slightest by the passage of the pin through the body. Before the use of the esophagoscope, the writer saw a child, 17 weeks old, who had swallowed a good sized button with a pin on the back of it which was passed eleven weeks later without injury to the child.

All foreign bodies in adults have been removed by the writer with the patients in the sitting position under local anesthesia. A unique case was that of an old lady, 67 years old, who had swallowed a large piece of ham without masticating it. When asked about the size of the ham, she said it was about the size of the end of her index finger. A physician was called and he insisted there was nothing in the esophagus because he had passed a stomach tube into the stomach. As the patient was unable to swallow, another physician was called in. He brought her to the Presbyterian Hospital, where the upper end of the esophagus was examined under anesthesia. Jackson's large speculum was used, and when the upper end of the esophagus was exposed, the piece of ham could be seen. There was great difficulty in removing it because every time it was grasped with forceps only a small piece would tear off. Finally after 45 minutes' work the esophagus was cleared out. The patient swallowed at once and with the exception of a bronchitis which lasted about a week, she made a good recovery. Among other foreign bodies were pieces of bone and a set of false teeth. In the last case the patient went to another hospital and was assured that there was nothing in the esophagus, though she had difficulty in swallowing. In removing bones with sharp edges one must be careful to so manipulate the object that the sharp edges will not lacerate the wall of the esophagus. This can usually be

done by coaxing the foreign body out rather than by using force. In the case of rubber plates which are tightly wedged in the esophagus, it is better to try to cut them up than to attempt to pull them out by main force, which is almost sure to result in injury of the wall. With patience and perseverance most foreign bodies can be removed with forceps.

*Symptomatology of foreign bodies in the esophagus.* The symptoms of foreign bodies in the esophagus vary according to the size of the object. Thus, if the foreign body be small and smooth there may be no alarming symptoms and in children the accident may only be discovered afterwards from the fact that the child has some trouble swallowing solid food. If the object is large there is always more or less effort to expel it and, failing in this, the muscular effort may force the foreign body down into the stomach. In some cases it may become impacted further down in the esophagus. If the object is particularly large there may be a spasm of the glottis with dyspnoea, cyanosis and collapse due primarily to irritation of the superior laryngeal nerve. Irritation of that portion of esophagus opposite the larynx gives rise to these symptoms. In some cases collapse may be so extreme as to cause death, though this is rare. The symptoms usually continue in a milder form or entirely subside. Impaction generally occurs at one of four points which are the narrowest points in the esophagus, viz.: At the upper end of the esophagus, the introitus esophagi at the sixth cervical intervertebral cartilage; at the level of the clavicle; opposite the fourth dorsal vertebra behind the arch of the aorta and at the point where the esophagus is crossed by the left bronchus; at the termination where it passes through the diaphragm. From possible anomalous construction of the esophagus other points of constriction may exist. Mehnert having described thirteen such. Foreign bodies are nearly always lodged at the upper end of the esophagus which makes their removal comparatively easy. If a foreign body becomes impacted, it usually remains in that particular position from the muscular contraction and swelling of the membrane; the higher up the impaction, the more marked the symptoms as a rule and the more rapid their onset. In many cases there are no symptoms for a long time except the slight difficulty in swallowing. When impaction comes on the symptoms are pain, dysphagia, regurgitation, nausea, vomiting, hiccough, cough, hoarseness and possibly hemorrhage; all these are not, as a rule, observed but some are always present. In children impaction high up presents a clinical picture which is almost diagnostic. The head is held

stiff to the right or left, saliva dribbles out of the open mouth, dysphagia is immediate and increasing and regurgitation is pronounced. These symptoms are particularly of sharp foreign bodies. With smooth objects the symptoms usually come on later when ulceration caused by prolonged pressure appears; pain is the predominant symptom increased on swallowing and tenderness can always be elicited by pressure on the cricoid cartilage in front or at the sides. If there is impaction at the aortic constriction symptoms are usually mild because the tissues here are more or less yielding. Dysphagia is not extreme and pain is nearly always slight and is referred to the region between the scapulae. Cough is early and persistent. Objects in this location may remain a long time without causing serious trouble, but there is always danger of ulceration through into the aorta with sudden death. Bronner reports the case of a boy who, at the age of 5 years, swallowed a coin. Fluids easily passed into the stomach, while solid food was swallowed with difficulty. For twenty-two months the symptoms were occasional paroxysmal cough, hoarseness and attacks of pain referred to the abdomen. An *x*-ray picture showed the coin at the level of the fifth dorsal vertebra or opposite the aorta. Fullerton saw a case in which a coin was impacted in this location for seven months; there were no symptoms until three weeks before removal. Jalaguier removed a coin from a child, 4 years old, which had been swallowed when the child was 16 months old. In Halstead's case a child, 5 years old, had suffered from vomiting, regurgitation and attacks of abdominal pain since infancy. The *x*-ray picture showed a coin impacted opposite the fourth dorsal vertebra which had been there for four and a half years. Impaction at the diaphragmatic constriction is very rare: symptoms are usually persistent and severe. Hiccough is persistent from the beginning; vomiting and pain are common.

*Diagnosis of foreign bodies in the esophagus.* In many cases, even when the foreign body is small, a definite history can be obtained and the diagnosis is simple, though no symptoms are present. Children are constantly putting things in their mouths and often the mother or the nurse is present and almost sees the object slip down the throat. In nearly every case there is some reflex symptom, such as coughing, choking or gagging, as the object passes down. In those cases where the child is away from home or no one happens to be present when the accident occurs, the primary symptoms may subside quickly, the object becomes fixed in the esophagus and nothing is suspected until the child begins to have trouble in swallowing. At this stage

an *x*-ray picture may clear the diagnosis if the foreign body will cast a shadow, but if not, an examination with the esophagoscope, which is a very simple procedure in a child, will always make the diagnosis between foreign body and congenital or acquired stricture. In a few cases in which there was no suspicion of a foreign body, an *x*-ray picture has developed the fact that both a stricture and a foreign body were present, the latter lying above the former. In all the cases, seen by the writer with the exception of one, the diagnosis was easily made from the history, which was definite as to the swallowing of a foreign body. When the primary symptoms subside and no suspicion of the presence of a foreign body exists, the mucous membrane swells around the object and protects it, as it were, sometimes for months or even years. Sooner or later, however, certain symptoms arise which point to the presence of the object and they may appear when it is too late to save life. In one case the only symptom was the sudden rupture of the aorta; the autopsy showed as the cause of death a foreign body in the esophagus which had ulcerated through into the aorta. The edema surrounding the object may go on to ulceration into the mediastinum, the trachea, the pleura or the pericardium, provided the foreign body is in the thoracic portion of the esophagus. In any part of the esophagus an acute inflammation may form in or around the tube with or without abscess which gives rise to severe symptoms, as intense pain, referred to the neck and chest, chills, fever, vomiting and dysphagia. Abscess in the upper part of the esophagus is usually accompanied by swelling of the neck. Rosenthal had a case of a boy in whom a piece of bone, impacted in the esophagus, perforated the wall and into the pleura causing pneumo-thorax. In another remarkable case a stud-button, impacted in the esophagus of a child, 7 months old, caused consolidation of the right lung, perforation of the trachea an inch above the bifurcation and pus in the bronchi and esophagus. Hemorrhage may be the first symptom of an ulceration which has progressed rapidly and insidiously; it has been known to occur as early as the eighth day. In a case reported by Heaton, hemorrhage occurred in a few hours after the impaction of a disc whistle in the esophagus. Hawley saw a case which resulted fatally after three hemorrhages from the esophagus of a boy, 4 years old; the autopsy showed a coin impacted an inch below the level of the arch of the aorta. On each side corresponding to the edges of the coin were deep ulcers, the left one communicating with the descending aorta. The foreign body had been in the esophagus six months.

In a case reported by Rolleston and Whipham, a girl, 3 years old, died of tubercular (?) peritonitis after an illness of three months. The autopsy revealed a headless pin, four and three-quarters inches long, resembling a hat-pin, in the esophagus with two and a half inches of the pointed end projecting upward and perforating the wall on the right just above the diaphragm, while the other end had also perforated the esophageal wall, pierced the diaphragm and perforated the superior mesenteric artery, causing a false aneurism between pancreas and duodenum. The cases related above are extreme and could scarcely occur now; the introduction of the esophagoscope has given us a means of examining the esophagus and diagnosing foreign bodies before perforation or ulceration comes on.

*The value of the x-ray in the diagnosis of foreign bodies.* What has been said as to the value of the x-ray in bronchoscopy applies equally to the esophagus. There are certain objects which will not show in a picture, but this does not make any difference in esophagoscopy because the method is comparatively simple. In fact, inability to get good x-ray pictures should not deter us from making a bronchoscopic or an esophageal examination. The information obtained from the examination is of great value positively or negatively. In locating coins the position will usually tell whether the object is in the trachea or the esophagus. If in the former, the edges will be antero-posterior because it passes through the glottis in this position and there is not sufficient space in the trachea for the coin to turn; if in the latter, the edges are transverse or lateral because the upper end of the esophagus is a transverse slit, which is the narrowest part of the tube and foreign bodies nearly always lodge here.

*Special methods of examining the esophagus.* Brunings and Mosher have devised methods of inflating the esophagus with air through the esophagoscope. Mosher uses a large oval tube which he introduces through his open speculum which has been referred to above; he then closes the end of the tube with a cap holding glass through which the operator looks. After the cap is in place, by means of a rubber bulb attached to the esophagoscope, air is pumped into the esophagus, which balloons up. Mosher claims that the method greatly simplifies the diagnosis of diverticulum in that the operator, looking through the glass, sees two distinct openings with the esophagus "ballooned up." According to him, the method also simplifies the examination of the esophagus because the walls can be more clearly seen. He says that the passage of the large tube causes a very sore throat for sev-

eral days and that the tube must always be passed under deep anesthesia. Brunings' apparatus consists of "an ordinary non-extensible esophagoscope, to which may be adapted a small closing cap provided with a sloping pane of looking glass. The cap is air-tight, and provided with a lateral tube for the attachment of an india-rubber inflator." He says the method is safe because any excess of air escapes into the stomach and the patient complains of pain if too much air escapes. He uses his method under local anesthesia, which would appear much safer than general anesthesia because he has the patient's aid in telling how much air to use safely. He says "the advantage of the method for the esophagus is limited in many cases by the closing cap rendering the employment of any operating instrument, and even the indispensable cleansing of the field of vision, impossible. Nevertheless, there are a few indications for it. If air is slowly pumped into the esophagus when the tube is high up, the lumen is developed in inverse ratio to the varying strength of external resistance. The mouth of the esophagus does not allow any air to escape past the tube, even when there is a high degree of pressure and expansion of the stomach. In the cervical section an enlargement of the lumen increasing downwards funnel-wise is observed, but this scarcely exceeds the diameter of from 0.5 to 1 centimetre. The lumen, however, increases remarkably in the thoracic section and especially in the pars infrabifurcalis. The increase in diameter is not equal on all sides but is most marked laterally, so that the bifurcation constriction and the aorta constriction become very prominent. They generally stand out in the lumen to such an extent that, in spite of the average width of the passage being 2 to 3 centimetres, it is not possible to see as far as the hiatus esophageus. The diaphragmatic constriction also appears during dilatation with great distinctness as a sharp band; normally it appears as a complete fissure-like occlusion, but masses of mucus are often seen moving up and down in the hiatus with the respiratory movements. I am hoping for some practical advantage from pneumatic esophagoscopy, especially in the case of spasms, pareses and dilatations, which often present great difficulties in diagnosis. Motor disturbances may depart in two directions from the normal physiological behavior described above. Expansibility may be diminished, or even abolished, through abnormal reflex contraction, or else expansion may meet with such an abnormally slight resistance that there is then no reflex peristalsis at all. Any existing dilatation, the recognition (in slighter degrees) and estimation of which (at an advanced stage)

would otherwise be doubtful, would become very prominent. For the pneumatic method it is indifferent whether the cardia is air-tight or not, as the air finds an adequate resistance at the pylorus for any admissible degree of inflation. Doubtless the diagnosis of an anatomical or spastic stenosis is aided by the process of inflation, as the form and position of the constriction or increased resistance is shown sharply against the expanded lumen. This method may also serve to locate the cardia, which is often difficult to see, and lies very excentrically, in dilatation of spasmodic origin, and so entrance into the stomach is facilitated. The procedure in pneumatic esophagoscopy is exceedingly simple, and requires no further description. There seems to me to be no danger whatever, provided that due attention is paid to the sensations of the patient, such as a feeling of pressure in the stomach." It will be seen that Brunings is not very enthusiastic over what has been accomplished with "pneumatic esophagoscopy." He seems to think that it has a future, but that it will have to be further developed. The writer has never used the method, hence the quotation from one who has had experience with it.

*Dilatation of the esophagus.* It is sometimes very difficult to extract large foreign bodies from the esophagus. Chief among these is the tooth-plate, which up to 1905 was successfully removed only five times in fifteen attempts through the natural passage, according to Starck's statistics. Four times it was pushed into the stomach and five times it was removed by external esophagotomy. To obviate these difficulties dilatation of the esophagus has been proposed. Killian in one case passed a steel wire snare around a plate and succeeded in burning through it and removing the fragments. The use of strong forceps for breaking up objects seems to be dangerous, especially if the foreign bodies are sharp. Brunings devised a dilatation esophagoscope which consists of a tube dilating unilaterally in its lower section only, by means of a lever outside. Its maximum width of dilatation is 5.5 centimeters and when this is exceeded the instrument automatically closes again. The tube is introduced by the sense of touch with the blades closed; after it is in the esophagus, it is turned 90 degrees so that "spreading takes place in the frontal plane." The tube is now opened 1.5 centimetres. Forceps are passed and the foreign body seized; the tube is now gradually opened wider and attempts made to dislodge the object, which is then drawn into the tube or turned and loosened so that it can be extracted without danger.

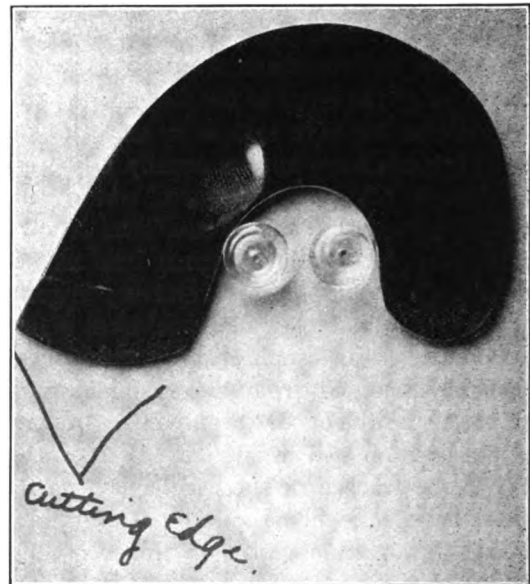
## A NEW TYPE OF SCALPEL.

G. S. FOSTER, M.D.,

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MANCHESTER, N. H.

The surgeon's knife is now made in many styles, but they are all similar to a marked degree. They all have many disadvantages. To overcome these I have modeled a new form which well serves my purpose.

The model herein pictured has several advantages. It is easily held within the palm of the hand



without the slightest danger of slipping. The shoulder of the scalpel rests against the thenar eminence, the middle finger passes through the groove, the index finger runs along the shaft toward the blade while the thumb guides, as its ball rests in an indentation on the side of the shaft opposite the index finger.

The blade is so constructed as to permit the entire length to incise at once. The stroke is made by merely moving the fingers. No wrist motion is necessary. Thus a much cleaner and less shocking incision is permitted.

Most scalpels permit the operator to use the distal third of the blade only. This is a marked disadvantage in that a clean, quickly-made and precise incision is quite impossible.

The scalpel herein described allows the operator to always have the full length of the blade in view. No picking or cumbersome movements are necessary. The blade can always be carefully watched and dexterous finger movements eliminate any wrist action.

Blunt dissection is readily carried out with the hilt. This part of the instrument is round, broad and thick. The soft tissues can be separated dexterously without tearing.

#### RÉSUMÉ OF ADVANTAGES.

1. Held firmly yet lightly without slipping.
  2. Clean incision by entire length of blade.
  3. Blade always in sight.
  4. Finger manipulation, no wrist action.
  5. False moves eliminated.
  6. Incision shock greatly lessened.
  7. Fits the hand nicely.
  8. Permits good blunt dissection.
- 967 ELM STREET.

#### REPORT OF TWO UNUSUAL FRACTURES:

##### 1. SIMULTANEOUS FRACTURE OF BOTH CLAVICLES. 2. UNIQUE CRUSHING FRACTURE OF TIBIA.

F. W. MCGUIRE, M.D.,

Attending Surgeon, Emergency Hospital,  
and

W. H. JOHNSON, M.D.,

House Surgeon, Emergency Hospital,  
BUFFALO, N. Y.

The following fracture cases are sufficiently rare and interesting to be reported.

Simultaneous fracture of both clavicles, as in Case I, is reported in the literature from time to time, but it is unique in our experience, for no other case has appeared at the Emergency Hospital, Buffalo, in the past five years.

CASE I:—Mr. S., aged 42, was brought to the clinic March 16, 1914, giving a history that a garbage wagon which he was driving overturned and was struck by a street-car, and he fell under the box of the wagon, which probably caused compression of both shoulders.

He sustained fractures of both clavicles, the right occurring at the middle third of the bone, and the left about one inch from the sterno-clavicular junction. Reduction was attempted and a double Sayre's dressing was applied, but, as the patient was of a rather low mentality, considerable difficulty was experienced in keeping the dressing in place. At the end of one week reduction in the right clavicle was almost perfect, but the fragments on the left side were again overlapping.

Under ether, a nail was driven into the fragments of the left clavicle through the skin and a Sayre's dressing was applied. Three weeks after the operation the patient was discharged, examination showing firm union and considerable callus.

CASE II is of much interest because of the character of the fracture and because union occurred in a bone from which a large segment of the entire shaft had been completely separated, the blood supply in the detached portion having been cut off. The fragment itself was not deprived of its periosteum,

however, and regeneration occurred without absorption of bone, firm union having taken place at the end of seven weeks.

Mr. P., aged 31, was brought to the clinic February 9, 1914, giving a history of having been

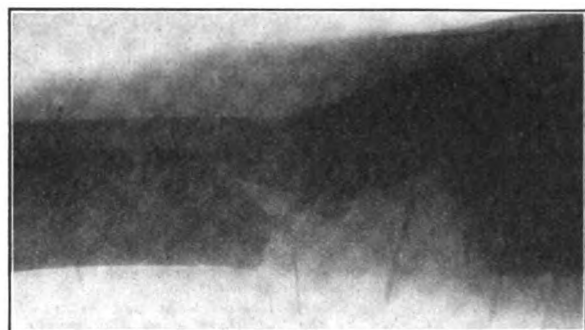


Fig. 1. Case II. Showing complete separation of the fragment. Note the notch in the upper portion of the tibia.

driving a wagon loaded with coal, the total weight of the wagon and contents being about three and one-half tons. The patient was walking alongside of the wagon, endeavoring to keep warm, when he slipped and fell on the snowy pavement, and a rear wheel of the heavily loaded wagon passed over the lower third of his left leg.



Fig. 2. Case II. After operation.

Examination disclosed what appeared to be a fracture at the junction of the middle and lower thirds of the tibia. Reduction was attempted and lateral splints were applied. An x-ray picture taken twenty-four hours later showed a peculiar fracture of the tibia and fibula, in that a fragment of bone, consisting of the entire shaft about three inches long, had been completely separated from the tibia, this length of the fragment corresponding almost exactly to the width of the wagon tire. The upper line of fracture was transverse with a slight notching of the surface, while the lower was an oblique break. (See figure 1.) Reduction being impossible, an operation was advised.

Under ether, the break was exposed and the upper end of the fragment was dove-tailed into the upper portion of the tibia and the lower end of the fragment had to be retained in place by means of a screw, as shown in figure 2. The fragment was still somewhat displaced after operation, but, at the end of three weeks, examination showed firm union with considerable callus. At the end of seven weeks the patient was discharged with no shortening and no deformity in the injured member.

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**WALTER M. BRICKNER, M.D., Editor**
**NEW YORK, NOVEMBER, 1914.**

## THE LANE PLATE.

The enthusiasm for the employment of Lane's metal plates for the fixation of fractured bones appears to be very much on the wane. This is as might have been expected. We have previously expressed the opinion, based on careful observation, that metal plates and screws applied to the broken bone ends are sometimes *of themselves* a cause of non-union, and that autoplasmic bone grafts used as splints or even only as osteogenetic factors, are far preferable physiologically. It is interesting to note the increasing use of such bone grafts in place of metal materials. Animal tissues are intolerant of foreign bodies. To be sure, needle fragments, bullets and other small metal substances often remain indefinitely and innocuously buried (usually in the muscles), and the same is true, very often indeed, of sutures of silk and linen in uninfected tissues. To be sure, too, metal plates and screws *sometimes* abide peacefully on and in human bones for long periods, perhaps even indefinitely, but such instances are the exceptions that prove the rule. Metal plates for filling cranial defects rarely remain in place for long, and the silver filigree sometimes used in very large herniæ is also always a doubtful expedient. Such a device is sometimes necessary, indeed, and so too, no doubt, is the metal bone plate or screw. But for most cases, at least, we believe that bone grafts and bone dowels are vastly to be preferred to metal ones. And, too, although we would not quarrel over the point, we regard such absorbable

materials as kangaroo tendon and chromicized cat-gut as preferable, in most instances, to silk and linen, for buried sutures and ligatures.—W. M. B.

## STIFF AND PAINFUL KNEE.

Not a little has been written in recent years concerning that often very puzzling condition, "stiff and painful shoulder"—puzzling often as to etiology, diagnosis and treatment. Thanks to the strides of a few observers, notably Cadman's concerning subacromial bursitis and T. Turner Thomas' concerning sprains and tears of the capsule, some of the varieties of shoulder disability are now much better understood—although concerning even these varieties many fallacies are still current.

The knee, a more complicated joint than the shoulder, and, like it, surrounded by tendinous structures and bursae, is, also like it, subject to puzzling conditions of prolonged disability after comparatively minor traumata.

Three recently published articles by Ernest Finch and Edred M. Corner of London and Robert Jones of Liverpool deal very lucidly with derangements of the knee joint, emphasizing, especially, however, dislocation of the semilunar cartilages, lacerations and gross sprains, loose bodies, rupture of the crucial ligaments and fracture of the tibial spine.

One or other of these conditions no doubt accounts for a considerable number of the cases of traumatic stiff and painful knee. There is no doubt, however, that there remains a still larger number of cases of prolonged knee disability, some traumatic and some developing, apparently, spontaneously, in which these internal derangements can be excluded. It seems not unlikely that in many of these the lesion is, as in the shoulder, entirely extra-articular and that greater attention to the tendons and bursae in the neighborhood of the joint may reveal a condition or set of conditions, perhaps akin to supraspinatus tendon tear and subacromial bursitis, that will much illuminate some of the still obscure types of stiff and painful knee.—W. M. B.

## AMERICA'S MEDICAL OPPORTUNITY.

We are told that the European war will prove to be America's industrial opportunity, that the paralysis of enterprises abroad will provide new markets for our own enterprises, that much of the foreign trade of the nations at war can be absorbed and perhaps permanently retained by America. The same conditions apply to post-graduate medical teaching. Certain it is that many of the large num-



ber of American medical men who had anticipated taking courses this year in Germany or Austria will turn now to the medical centers of their own country for instruction, and it is not unlikely that many will come to us from Central and South America.

How well are New York, Chicago, Philadelphia, Boston, Baltimore equipped to take up the work that perforce must languish in the great European universities and clinics?

Of clinical material, of surgical skill, of modern hospital management and therapeutic methods, there are ample for all to behold. But of opportunities for actual clinical work and laboratory study there are, we fear, too few; and in autopsy material we certainly lag far behind.

What efforts, then, will be made in our large cities to attract and retain the students that Europe must now deny?

How will our large hospitals and laboratories be opened to them? To "see America first" will, for a time at least, be a necessity. What are we going to do to make it a habit?

To develop teaching develops teachers, which means the stimulation of research and the advancement of scientific medicine. This is America's medical opportunity. Are we going to grasp it?—  
W. M. B.

#### LETTER TO THE EDITOR.

#### PRIMEVAL OBSTETRICS PERPETUATED.

NORRISTOWN, PA., September 25, 1914.

*To the Editor:*

That it is more by good luck than good management that many cases of labor terminate as favorably as they do cannot be gainsaid. That there is a special Divinity which watches over womankind during her accouchement is very likely. What Holmes and Semmelweis enunciated, what theories have been proven facts, and what technic elaborated have evidently not been accorded more than of academic value when one follows the practice of many physicians, other than specialists in obstetrics. It is a rarity here for the physician to use rubber gloves, and almost unknown for him to wear a gown. In fact, the public has been so educated here that they ridicule the use of gloves or gown. I have seen two practitioners of quite some local repute wash up in a most cursory manner, put the patient, who was in labor, in the Sims position, and in a most gentlemanly and modest way thrust the hand under the bed clothes and after some feeling around (vaginal examination?) succeed in diagnosing the position of the fetus and condition of the os, etc. The position of the patient and the maneuvers of the physician were more adapted to massaging the prostate in the male. At this method they have become as adept as an old nurse I met in London who boasted of her ability to catheterize the female in the dark.

Another physician, of a later vintage and enjoying a big patronage, covers his examining fingers with a part of the first household sheet he can get.

Douching of the puerperal vagina is still relegated by the physician to some member of the household or a nurse of as much merit.

*Question:* Does the public or the physician require more education? Who would you blame?

D. NATHAN, M.D.

615 WEST MARSHALL STREET.

## Surgical Suggestions

To secure good exposure by a transverse incision of the upper abdomen it is important that the level of the incision should not be too high. It should pass through the wide portion of the costal arch, not far from the umbilicus.

In closing wounds we believe it is undesirable to pass skin sutures through the subcutaneous fat, which is easily liquefied and infected. The fat layer, however thick, is amply coated by the closure of the skin and the application of the dressing.

For the closure of abdominal and other wounds fine sutures applied close to the skin edge and only through the skin thickness produce little or no scarring. Those taking large "bites" of the skin and subcutaneous fat, so commonly used, leave ugly "stepladder" or "centipede" scars. Tension sutures, too, also used by many surgeons, are rarely necessary, even after breast amputations.

A very satisfactory operation for umbilical hernia in cases where the ring is not of huge size and the abdominal wall not attenuated, consists in splitting open, like an oyster, each rectus sheath at the ring and for a greater or less distance in the linea alba above and below, and suturing together the posterior and the anterior layers of the two sheaths in separate layers. If the rectus muscles are not separated, as they so often are in multiparous women, the aponeurosis sutures are sufficient to approximate them. If they are separated, it is undesirable to stretch and tear them by approximating muscle sutures. The operation can be performed through a vertical or a transverse incision. The former is the more convenient and the less disfiguring.

## Surgical Sociology

Ira S. Wile, M. D., Department Editor.

### HOSPITALS CRITICISED.

C. H. Mayo, in the *Modern Hospital*, October, 1914, criticises directly or by implication many factors in hospital organization. It is unnecessary to discuss in detail the numerous points brought out by Dr. Mayo, but certain phases at least merit passing consideration.

Because of the peculiar conditions existing at Rochester, Minnesota, and because of the rush of patients which overcrowds the hospital proper, surgical patients are seldom retained in the hospital for longer than one or two weeks. As soon as possible the surgical patients leave the hospital and are transported to a hotel or private home, where they receive their further treatment.

Upon this local experience Dr. Mayo criticises as inefficient the maintenance of patients in hospitals for the period of time necessary for convalescence. He states that "To keep a patient in the hospital longer than is necessary is an unwarranted expense to him or an unjustified tax on those who contribute to hospital expenses, besides keeping some other needy patient from being cared for." As far as the expense to the patient is concerned, it must not be forgotten that the patient under the Rochester plan continues to have an expense as a result of transportation to another institution. On the other hand, the facilities for surgical care in private homes are by no means equal to those afforded in a hospital.

In general, the criticism has been leveled against hospitals that they fail to send out their patients in a condition enabling them to resume their activities. It is true that convalescence is often protracted and there is a pronounced need for the establishment of convalescent homes. The cost of such institutions, however, would in no wise decrease the expenditure of the patient now retained in the beds of private hospitals. It is desirable, until such retreats for convalescent patients can be established in sufficient number, that patients be retained in the hospitals until their condition warrants removal to their homes. In the case of the poor whose homes are not the best places for the promotion of good health, it would be far better hospital efficiency, viewed from the standpoint of end-results, to retain the patient until his restoration to health is practically established.

All cities do not have the perfect systematic organization that exists in the city of the Mayos, and consequently hospitals are unable to empty their beds with the rapidity and facility which exists in that well-developed surgical center. It is unfair, however, to criticise this particular type of hospital activity as inefficient, merely because the beds are not released as quickly as is possible at the St. Mary's Hospital, where almost all of the patients pay for their care and treatment.

One point of implied criticism deserves especial consideration. It is suggested that many surgical

procedures, particularly upon the female sex organs, should be discarded, but are being performed owing to a lack of knowledge of their after-results. Obviously, with proper investigation of hospital surgery there should be some indication of the actual surgical result, not merely at the time of discharge from the hospital, but after the lapse of a sufficient period of time to test its value.

The doctrine of efficiency has not been established for a sufficiently long period of time to have provided the type of record that is essential for determining the success or failure of operative procedures. Until such figures are available, it is necessary for surgeons to utilize their best judgment, based upon known facts in determining the type of operation that shall be performed. It is true, however, that conservatism in surgery is more necessary now than ever. The preservation of a careful technic has robbed ordinary surgical procedures of most of their dangers and surgical mistakes do not necessarily involve loss of life, though they may impair function. The impairment of function, however, demands every thought on the part of the operator, because it may seriously interfere with the development of a normal life on the part of the patients.

"A hospital should be responsible for correct records of all operations and treatments of patients who enter the institution. This should be made by the superintendent, registrar, or interne, and kept, not for public inspection, but as a record for increasing hospital efficiency. The report showing the mistakes in diagnosis, and the number of patients who came back for a second operation because the first did not benefit, would be instructive. The number who have evidently more than one trouble, the presence of which could so easily have been found by observation at the time of the first operation, becomes a serious matter when we think of the lost time, double risk, and burden of expense thrust unnecessarily on such patients or on the community."

This paragraph contains a thought of immense importance in the development and maintenance of hospital efficiency. Hospital abuse should not be tolerated. Undoubtedly, many hospitals at the present time are unknowingly being subjected to procedures which are contrary to the spirit of modern medicine and reflect discreditably upon medicine and surgery. Unfortunately, many hospitals, characterized as public in their scope, are veritably private hospitals assisted from public funds for the benefit of a few physicians and surgeons who have actually come to believe that the institutions exist for their own personal aggrandizement, improvement and commercial betterment.

Surgeons themselves should be the first to criticize their own institutions and to watch with the utmost care the character of the work performed by their colleagues in surgical cases. Wholesome criticisms of a constructive nature leading to the betterment of the surgical fraternity are always desirable. The more quickly hospitals are purged from irritating forces, the better it will be for the hospitals, the patients, and the profession.

## A MOTORCYCLE AMBULANCE.

The utilization of motor vehicles in modern warfare has largely altered the activities of large military organization. Detachments of soldiers mounted on motorcycles have been exceedingly useful for scouting purposes. Traction engines have made possible the conveying of supplies with great rapidity in the wage of advancing columns. For the gathering of supplies, the rushing of messages, the quick transfer of guns, ammunition, and general supplies, no method of transportation has been found to equal that of gasoline motor power.

The use of the motor ambulances is fast superseding the old familiar horse- or mule-drawn ambulance. As a further means of rapid transportation of the injured there now exists the motorcycle with a stretcher side car. This cheap conveyance is destined to perform valuable service in connection with the prompt removal of wounded from the battlefield or first aid stations to regimental, division or base of hospitals. Increased efficiency must necessarily result and the services of the hospital corps be immeasurably enhanced in value through the elimination of unnecessary litter carrying by the hospital corps or by non-combatants.

While it is possible that ambulances of this type may not become popular for city use, there is little question that it forms an inexpensive and valuable type of transportation for use in rural communities where local hospitals do not exist and where transference to hospitals in nearby cities must be prompt and rapid, in order to insure the recovery of injured or otherwise stricken individuals.

The complexities of hospital provision for small communities would be somewhat relieved if there could be established a system of ambulances of motor type, even of the cycle car and side stretcher variety. In relief work beyond that of the first aid variety, prompt hospital attention is essential. The heavy motor ambulances employed by large municipal or volunteer hospitals are too expensive for smaller communities. It is reasonable to expect that the development of this smaller unit ambulance will prove itself to be an acquisitions in the relief of the injured, not merely on the fields of battle, but also in the realm of industrial strife.

## SPINAL PUNCTURE.

Contrary to what we observe in normal individuals, namely, appearance of headache when some spinal fluid is withdrawn for diagnostic purposes, in infectious diseases the existing headache is greatly relieved and even removed totally. The procedure is an innocuous one and deserves extensive use in the course of infectious diseases in which pain in the head is frequently one of the most disturbing and distressing manifestations.—ALFRED GORDON in *The Therapeutic Gazette*.

## Book Reviews

**Practical Therapeutics.** By DANIEL M. HOYT M.D., formerly Instructor in Therapeutics, University of Pennsylvania; Fellow of the College of Physicians; Assistant Physician to the Philadelphia General Hospital. *Second Edition.* Octavo; 426 pages. St. Louis, C. V. MOSBY COMPANY, 1914. Price, \$5.00.

This book is a handy volume of ready reference for the practitioner. The first half deals with the drugs of the pharmacopeia, their physiological action, therapeutic application and toxicology. The subject matter is well handled and the descriptions of the drugs and their uses, though brief, are complete. The second half of the book consists of the new and non-official remedies, permission to include these descriptions having been given by the American Medical Association. The addition of this portion of the book makes the volume of considerably more practical value than is the ordinary book on therapy.

Under the heading of Drugs Used as Specifics are included diphtheria antitoxin and tuberculin. Under the title of the von Pirquet Reaction the procedure is described as follows: "The lymph is dropped on the arm in two places, three or four inches apart, and a stab is made with a small scalpel through the tuberculin. The tuberculin is then rubbed well into the incision," etc. This is certainly not the procedure as described by von Pirquet, and as the reviewer has quite recently had opportunity to observe, it may lead to serious results from the absorption of too large an amount of tuberculin.

Under the heading of dosage of diphtheria antitoxin 4,000 units is arbitrarily given as the adult dose, to be repeated in twelve hours, if necessary. This, it will probably be universally agreed, is too small a dose.

**Serology of Nervous and Mental Diseases.** By D. M. KAPLAN, M.D., Director of Clinical and Research Laboratories of the Neurological Institute; Serologist to the Montefiore Home, New York City. Small octavo; 346 pages; illustrated. Philadelphia and London: W. B. SAUNDERS COMPANY, 1914.

In this book the reader will find a very careful and complete consideration of the serological aspect of neurological diseases. After taking up in detail the technic of lumbar puncture, the author devotes considerable space to a description of the normal spinal fluid, and the various tests to which it may be subjected. This, of course, includes a discussion in detail of the Wassermann reaction. The second part of the book deals with the serological study of non-luetic nervous diseases, while the latter half treats of syphilis and salvarsan. The subject-matter is well handled and the value of the work is greatly enhanced by the excellent bibliography, which covers seventy pages and includes references from English, French and German literature. This bibliography alone is of great usefulness and should make the book almost indispensable to anyone working in the field of serology. As Kaplan states in his preface, there is no volume in the English language which treats of the serology of nervous diseases, and this work should therefore form a welcome addition to the practitioner's library.

**Collected Papers by the Staff of St. Mary's Hospital, Mayo Clinic.** Rochester, Minn., 1913. Edited by MRS. M. H. MELLISH. Large octavo; 819 pages; 335 illustrations. Philadelphia and London: W. B. SAUNDERS CO., 1914.

This volume, the seventh of the series of collected Mayo papers, contains the papers published last year by twenty-eight members of the Mayo staff, classified under appropriate subject-headings, supplied with indices, and handsomely illustrated. Like the preceding volumes this one is rich in valuable clinical observation, technical information and the results of certain pathological studies.

## Progress in Surgery

### A Résumé of Recent Literature.

#### Experimental and Clinical Studies of Colon Stasis.

J. R. EASTMAN, Indianapolis. *Journal American Medical Association*, Aug. 8, 1914.

The subject of colonic toxemia, can be studied under the four headings of (a) colitis; (b) adhesions, membranes and kinks; (c) colon dilatations and visceroptosis, and (d) stasis. Many questions of alimentary toxemia are more or less dependent on these factors. As regards the causes of these conditions those which are more or less commonly found in dogs and can be produced in rabbits, are discussed. Many writers have expressed the belief that plastic adhesions can be produced by toxins in the large intestine and Bassler has described a bacterium to which he ascribes the origin of pericolic adhesions. Adams also supports the view of a bacterial origin. The clinical consequences of membrane formation are somewhat varied but this does not prove that they are always responsible for stasis. A delicate vascular form of membrane may exist without constipation in young persons and is found in most every case of chronic appendicitis, which it probably favors. Pericolic adhesions nearly always give rise to some disturbance and has been able to occasionally relieve colon stasis by division of a surrounding membrane. It seems reasonably fair to say that such membranous adhesions may induce colon stasis and also favor the penetration of bacteria from the bowel and thus reproduce themselves. Somewhat similar interchange of cause and effect is presented in colon ptosis and seems to be almost constantly associated with it. The treatment must vary according to the peculiarities of each case. Purely medical treatment with petroleum oil, Weir Mitchell feeding according to Coffey's plan and a medical treatment aimed at arrest of intestinal infection, all may have their value, and hygiene, regular vigorous exercise and proper living, will do still more. The surgical treatment is not yet fully ready for discussion. Among the methods proposed he mentions those of Coffey and C. A. L. Reed and those of Arbuthnot Lane whose best known operative exploits are based on Metchnikoff's theory that we are better off without a colon. Whichever method is used should be determined after the abdomen has been opened and explored and not fixed upon before operation. Little is to be expected from very extensive removal of pericolic membrane. If short-circuiting is done, special care should be exercised in selecting the colon surface to be anastomosed. Anastomosis of the caput-coli at its lowest level with the rectum has all the advantages and eliminates some of the evils of iliocecostomy. The opening of communication should be amply large and the appendix, though normal, should be excised if in the way, as should also the sigmoid, if dilated and very redundant. The improvement following short-circuiting operations is probably due somewhat to the relief of colitis or the associated factors. Direct drainage favors the escape of bacteria-laden secretions which aggravated the colitis and this is a probability in stasis cases where the colon is not fettered by firm adhesions. Where the colon is not thus hopelessly fettered the purpose of a well-planned short-circuiting operation should be not to put the colon out of commission but by relief of colitis and pericolicitis to put it back into its normal function.

#### Resection of the First Portion of the Large Intestine and the Resulting Effect on Its Functions. W. J. MAYO, Rochester, *Journal American Medical Association*, Aug. 8, 1914.

The variations in anatomy and the function of the large intestine are reviewed by Mayo, who points out the different uses of the part proximal to the splenic flexure and the descending colon and sigmoid. The changes in function in early life are pointed out and reasoning from analogy he says we can assume that the functional activity

of the proximal half of the large intestine concerns vegetable intake. In the herbivora this portion is a sort of silo in which fermentation of vegetable materials takes place, developing nutritive products of great value. Within the past one hundred years it has been shown that the flesh intake of man has been increased four-fold and its decomposition in the intestine develops poisonous products which may be absorbed, and Mayo describes a peculiar form of silent constipation with thin-walled bowel and no abdominal distention, accompanied with symptoms which may be attributed to neurasthenia or even be mistaken for exophthalmic goiter in severe cases, which he attributes to such absorption. From a small number of patients—about twenty—with exaggerated conditions of seccolic stasis and associated nervous symptoms, he has removed ten inches of the terminal ileum, appendix, cecum, ascending colon, hepatic flexure and a portion of the transverse colon, not trespassing to any extent on the transverse colon which contains the omentum. If all the omentum is removed damaging adhesions subsequently occur, with disastrous sequels. In all the cases in which this resection was made and the ileum joined to the transverse colon, there has been marked improvement and relief from constipation. Nearly all of them had been operated on before for appendicitis, etc. He thinks that it removed the cause, in some cases at least, of the existing intestinal toxemia. Although the operation is a serious one, none of the patients has been lost, but the number of persons for whom it is suitable is, Mayo believes, a very limited one.

#### Observations on the Movements of the Isolated Human Vermiform Appendix. J. A. GUNN and R. H. A. WHITELOCKE, Oxford. *The British Journal of Surgery*, July, 1914.

Although in the nature of a preliminary report, the observations of the authors are sufficiently significant to be reviewed. Gunn has shown that the removed mammalian organ ceases contracting when placed in ordinary Locke's solution, but, when supplied with oxygenated Locke's solution at body temperature, the contractions return. With this knowledge it was possible to investigate any excised tissues removed at surgical operations. Experiments of this nature are of course far removed from those possible with human tissues removed postmortem.

The authors found that in the isolated human appendix "there are typically present larger contractions with (usually) superimposed smaller contractions." The excised rabbit's appendix was then found to have a similar contractile wave. It was compared with the movements of the appendix in situ, and a close parallel was found. The authors therefore believe that the movements of the excised human appendix closely simulate those of the human appendix in situ. The authors then demonstrated that, as was expected, the appendix has a double nerve supply—splanchnic and pelvic visceral. The most lively movements of the appendix were found in the organs removed from young patients under ten years of age. The last point established up to the present is "that a very severely inflamed appendix may still show spontaneous movements of not definitely aberrant type."

#### The Use of the Omentum in Abdominal Drainage. L. S. RAMSDALL, Manistee, Mich. *The Journal of the Michigan State Medical Society*, September, 1914.

Ramsdall believes that tucking the omentum around the infected area in an abdominal wound and securing it by a stitch or two of fine gut, is a great safeguard against spreading the infection. He uses the omentum in this way as soon as the infected area is opened and then uses gauze packings. The procedure protects the rest of the abdominal cavity from free pus which would result in peritonitis or secondary abscess. It requires little handling of the bowels and less packing. It requires a smaller incision. It assures better and quicker drainage. It does away with too large a drain. It localizes any secondary hemorrhage. It causes less liability to the formation of post-operative adhesions.

**Spinal Anesthesia in Gynecology.** GEORGE GELLHORN, St. Louis. *Surgery, Gynecology and Obstetrics*, October, 1914.

Gellhorn reviews his results in 169 cases, laying particular emphasis upon technic. He prefers it to inhalation narcosis, but not to the exclusion of the latter and, indeed, occasionally combined the methods. He finds advantages in the absence of nausea and vomiting and in the relaxation of the abdominal walls with its consequent ease of manipulation and diminution of shock. Analgesia is not always perfect. Headaches, backaches, numbness in the legs, are occasional temporary after-effects, and acetoneuria is not infrequently seen. Patients with pulmonary and cardiac lesions notoriously bear spinal anesthesia better than inhalation narcosis, and disturbances of these organs are comparatively rare after the spinal method has been employed.

**The Mortality in Cesarean Section.** GEORGE M. BOYD, *American Journal of Obstetrics*, September, 1914.

The author reviews the histories of forty-eight Cesarean sections and concludes that the mortality resulting from the operation arises mainly from two factors—the skill of the operator and the condition of the patient. In clean cases operated upon before labor, the maternal mortality should not be more than from two to three per cent. The labor test does not necessarily contraindicate the classical operation provided the patient is under careful supervision, but after the membranes rupture there is danger of infection. The classical operation should not be performed in cases in which there is undoubted infection; in these cases the extra or transperitoneal operation should be done. When the patient is seen late in labor and is undoubtedly infected, supravaginal hysterectomy should be performed, as the mortality of Cesarean section is then very high, probably twenty-five per cent.

**The Surgical Treatment of Complete Prolapse of the Uterus.** EMIL NOVAK, Baltimore. *Surgery, Gynecology and Obstetrics*, September, 1914.

Novak believes that the Watkins-Schanta operation offers a greater probability of cure than any other operative procedure, but it is a major operation requiring greater skill than most abdominal operations for pelvic disease. Unless the uterus is small and atrophic so that it offers no support to the bladder, or unless there is a suspicion of malignant disease, it is better to retain it. Novak recommends Goffe's method under these conditions. Amputation of the cervix should be done only when it is long and hypertrophic or when it is ulcerated. An essential of the transposition operation is a well-done perineorrhaphy.

**Notes on Vesico-Uterine Transposition.** THOMAS J. WATKINS, Chicago. *Surgery, Gynecology and Obstetrics*, September, 1914.

Watkins thinks this operation for prolapsus uteri which goes by his name should be performed before there is much protrusion through the vaginal orifice, as the prolapse increases after this takes place, and the greater the prolapse, the greater the dangers of recurrence after the operation. The cystocele, the most important pathological condition, is cured by the operation. Occasionally a recurrence of the prolapse takes place except when the vaginal canal can be obliterated; but this can usually be remedied. The operator must conform his technic to each individual case.

**The Origin and Nature of Fetal Movements.** EVARTS A. GRAHAM, Chicago. *Surgery, Gynecology and Obstetrics*, September, 1914.

From a series of experiments and control experiments on pregnant guinea pigs, the author concludes that a sufficient degree of asphyxia in the fetus will produce more or less severe fetal movements, sometimes respiratory attempts, or they may even become severe muscular contractions simulating general convulsions from CO<sub>2</sub> poisoning in adults. All of the generally recognized fetal movements except those concerned with swallowing and

sucking have been experimentally produced by methods which induce asphyxia of the fetus. The author thinks that the active movements of the fetus felt by many pregnant women toward the end of pregnancy are expressions of a more or less severe but transient asphyxia of the fetus.

**A Study of the End-Results of Interposition of the Uterus.** J. O. POLAK, *Surgery, Gynecology and Obstetrics*, October, 1914.

From a survey of his cases, Polak states that the operation of interposition of the uterus should be limited to women at or near the menopause who have small uteri. If the operation is performed in those still menstruating, the tubes should be ligated to produce sterility. He finds that cases of prolapse in which the sliding takes place in the post-pubic cleavage line are not helped by this operation. Morbidity following the procedure is due mainly to imperfect hemostasis and vesical injury. In anteverting the uterus, its anterior wall should rest on the fascial plate just behind the pubis and the fundus should not be brought under the arch because excessive anterior displacement favors recurrence and interferes with drainage. The uterus should always be curetted and the scrapings submitted to microscopic examination.

**Can Surgery be Eliminated in the Treatment of Fibroid Tumors of the Uterus?** JOHN A. MCGLENN, *Surgery, Gynecology and Obstetrics*, October, 1914.

While the author admits that Roentgentherapy has an important place in the treatment of fibroid tumors of the uterus, he asserts that surgical measures constitute the treatment of preference and cannot be supplanted. The surgeon and the x-ray operators should not compete with each other in the treatment of these neoplasms but should cooperate.

**The Treatment of Inoperable Carcinoma of the Uterus by Application of Heat.** J. F. PERCY, Galesburg. *Surgery, Gynecology and Obstetrics*, October, 1914.

By means of an electric heating iron, a water-cooled speculum and a vaginal dilator, Percy applies heat to the carcinoma mass without destroying the normal cells. Cancer is destroyed when the temperature in the mass is raised from 122° F. to 131.9° F., while the normal tissues remain unchanged until the temperature is higher than 131° F. Cauterization is not aimed at, but the production and dissemination of heat in the cancer mass. Too much must not be attempted at one sitting, as these patients cannot endure a long anesthesia. Percy advises against the preliminary use of the curette. By this method he believes that fifty per cent of practically hopeless cases can be rendered free from recurrence for a period of five years.

**Additional Observations Upon the Operative Mobilization of Ankylosed Joints With Reference to the Ultimate Results of Arthroplasty.** (*Weitere Erfahrungen ueber die Operative Mobilisierung Ankylosierter Gelenke, mit Bemecksichtigung des spaeteren Schicksals der Arthroplastik.*) E. PAYR, Leipzig. *Deutsche Zeitschrift fuer Chirurgie*, Vol. 129.

This is in reality a monograph of 120 pages dealing in detail with the results that Payr has obtained in the past four years. Many interesting observations are made of the evolution of the joint surfaces after operation, the development of new nerve supply, the muscle and nerve reflexes, the alterations in the bones entering the diseased area, etc., etc. The indications for operation and the important post-operative treatment are carefully analyzed. Of the last 22 operations, most consisted in interposition of soft parts. Eleven of the operations were upon the knee joint. Two were failures and the results were very good in seven. Of the three operations on the hip joint, the results were excellent in two, poor in the third. Two excellent and one good result in three elbow cases, two good results in finger ankylosis, and a failure in a shoulder case complete the list.

### The Clinical Picture of Osteochondritis Deformans Juvenilis. DR. BRANDES, Kiel, *Medizinische Klinik*, July 12, 1914.

The author summarizes the present state of our knowledge concerning this new clinical entity. His own experience includes ten cases observed in the Kiel Surgical Clinic. The disease is one occurring in children from three to fifteen years of age, more often in boys than in girls. The onset is gradual with the appearance of a limp and very slight pain. The limp increases until it is very pronounced. Examination reveals slight atrophy of the affected leg with prominence of the trochanter. Pain is referred to the hip. There is no pain on pressure or jolting of the limb. There is shortening of the affected limb of not over 2 cm. Flexion, both active and passive, is free, but there is very marked limitation of abduction at the hip. This is the characteristic feature. Rotation and adduction may be slightly impaired.

The course is exceedingly chronic, the disease however usually finally healing and having a fairly sound extremity. Roentgen examination shows various degrees of destruction of the head of the femur. The process begins subchondrally and rarely attacks the acetabulum.

The author points out that the pathological characteristics are not the same as those found in senile osteoarthritis, and that this disease occurring in childhood has a distinct course and pathology and must be considered a separate clinical entity.

The prognosis is good and the disease must be clinically differentiated from coxa vara and acute coxitis.

### Sacro-Iliac Displacement. JAMES K. YOUNG, Philadelphia, *Interstate Medical Journal*, August, 1914.

Many cases of rebellious sciatica, lumbago, backache and kindred affections find their etiology in some abnormality of the sacro-iliac articulation. The normal tonicity of the pelvic ligaments are prone to suffer in instances of passive congestion, menstruation and pregnancy.

The simplest abnormality of the sacro-iliac joint is strain whose disappearance depends upon the correct reciprocal action being readjusted between the various groups of muscles. If the strain continues, however, there results a sudden or gradual displacement or giving away of the ligamentous attachments, associated with pronounced instability of the joint. Slight luxations are prone to affect other joint structures in the pelvic girdle.

The clinical varieties are (1) traumatic, (2) static. The former may follow very slight trauma as a misstep. The latter is mechanical in character and is divided into a neurotic and a uterine variety. Likewise the locking of the sacro iliac articulation through enlargement of the transverse process of the last lumbar vertebra may also give rise to sacro-iliac strain.

The symptoms are pain, limitation of motion, abnormal mobility and changes in attitude.

Reduction may occur spontaneously, but recurrences are usual. When reduction cannot be effected spontaneously, place the patient on his face, produce forced extension with traction on the limb, or place the patient between two chairs, a foot and a half apart, and make downward pressure over the site of the joint. It is sometimes necessary to resort to forcible correction under anesthesia. The joint is then immobilized by plaster or an orthopedic apparatus. In the after-treatment massage, electricity and vibration are of greatest importance.

### Bone Transplantation Into the Spinous Processes of the Vertebrae for the Cure of Tuberculous Spine Disease. CHARLES M. JACOBS, Chicago, *Illinois Medical Journal*, August, 1914.

From a study of nine cases which the author reports in detail, he draws the following conclusions:

1. In children, with caries of the cervical, lower dorsal and lumbar vertebrae, conservative treatment should be the first resort; in middle and upper dorsal Pott's disease or where conservative treatment has been tried with disappointing results, Albee's surgical method is the treatment par excellence.

2. In adults, where time plays an important part and where rapid results are desired, surgical treatment is the method of selection.

3. The value of a good skiagraph of the tuberculous area of the spine cannot be overestimated. A definite knowledge of the extent of the pathologic process should be had before proceeding to operate. Success here depends, primarily, upon the graft being implanted into the spinous processes of all of the diseased vertebrae and at least two contiguous vertebrae above and below them.

4. Too early reliance cannot be placed on the strength of the bone graft. It takes time for the splint to become securely fixed by permanent callus.

5. External support, either casts or braces, must not be disregarded for many months following the operation.

6. Even with continuation of post-operative external support for a period of six to twelve months the duration of treatment is much shorter than the average duration under non-operative treatment.

7. Albee's surgical method incurs no serious risk to the patient. But the operator who has not been particularly trained for this work may expect unpleasant results.

### Aperiosteal Amputation. H. H. M. LYLE, New York. *Journal American Medical Association*, October 3, 1914.

Lyle advocates the aperiosteal method in amputations. Hirsch's investigations showed that in the old method of stripping up periosteum cuffs to cover the bone many shreds of periosteum resulted and produced painful bony spikes, interfering with the function of the stump. He reintroduced the Celsian method of dividing periosteum and bone at the same level, adding to it massage, exercise and early use. Bunge went a step further and advised the removal of 1 cm. of periosteum and the scraping out of bone-marrow for a similar distance. This method had an extensive practical test in the Russian, Japanese and Balkan wars. Lyle quotes Ranzi's statistics from Von Eiselsberg's clinic of the results of aperiosteal amputations of the leg which were very satisfactory on the whole. The remarkable feature of that report is the number of stumps obtained in infected cases. Lyle gives the technic in full. He concludes that while the osteoplastic method is ideal, it requires ideal conditions. The tendinoplastic is of limited value, the periosteal, though employed by the majority of surgeons in this country, is inferior to other methods. The aperiosteal, in the advent of complications of healing, is the only one that will give a useful end-bearing stump and is the simplest and most generally practicable.

### Arthrotomy for Injuries of the Menisci by Longitudinal Incision Through the Patella. (*Eröffnung des Kniegelenkes bei Meniscus-verletzungen durch Laengsschnitt mitten ueber die Patella und deren Durchsaegung.*) P. BABITZKI, Kiev. *Deutsche Medizinische Wochenschrift*, July 30, 1914.

The usual methods of operating upon the knee-joint are generally planned for ankylosis following the operation (tuberculosis, neoplasm). The author finds that the operations devised for exposure of the joint in order to treat injuries of the menisci are inadequate, because the exposure is incomplete. After study on the cadaver Babitzki employed the following technic with excellent result: Free vertical, incision crossing the patella. The latter is fixed by slightly flexing the knee and is longitudinally divided through its middle. The halves are then forced to the lateral aspects of the condyles, and rotated outwards at the same time. An excellent exposure of all the recesses of the joint is thereby obtained, the joint being fully flexed. The wound is sutured in layers, suture of patella being unnecessary.

### Contribution to the Study of Syphilis of the Bladder. (*Contribution à l'Etude de la Syphilis Vésicale.*) G. GAYET and FAVRE, Lyons. *Journal d'Urologie Médicale et Chirurgicale*, July 15, 1914.

Vesical syphilis is generally considered an extremely rare lesion. Until 1900 the diagnosis was made only on the basis of results from anti-syphilitic treatment. Matzenauer then demonstrated the first case by cystoscopic examination; about twenty cases of tertiary lesions have since been demonstrated. The lesion may consist of a



tumor, senile or pedunculated, that resembles a polyp in every way. Or it may consist of a series of papillomata of varying sizes, the group being generally situated near the trigone. Ulcerations may be the only visible lesions in a third group of cases. Specific treatment has resulted in retrogression of the lesion in every reported case.

Three cases are reported by the authors. The first was a tabetic suddenly seized with hematuria. Cystoscopy revealed multiple ulcers; mixed treatment was promptly curative. The second, a female, complained of hematuria of one week's duration. Examination revealed a gumma of large size in the ureteral region. Its gradual disappearance under anti-syphilitic treatment was observed at frequent intervals. The third case is incomplete. The patient acquired syphilis twelve years before. Hematuria of vesical origin developed, and cystoscopy revealed an ulcerative cystitis. Hematuria rapidly disappeared upon mixed treatment and the ulcerations are now healing.

The authors believe that many cases of cystitis in which the diagnosis has not been established may prove to be of syphilitic nature. The diagnosis depends upon the history, the presence of other syphilitic lesions, the Wassermann reaction, and, above all, upon the results of specific treatment.

#### **Present Status of the Verumontanum in Deep Urethral Diseases.** J. A. HAWKINS, Pittsburgh. *New York Medical Journal*, October 10, 1914.

As the result of fourteen years' observation, Hawkins is convinced that the verumontanum is the seat of most genito-urinary neuroses. The symptoms of inflammation of the verumontanum are the following:

1. Sacral pains.
2. Pain or burning in the distal inch of the urethra.
3. Urinary frequency with effort to expel what seems to be "the last drop"; sometimes the tenesmus is followed by the appearance of a drop of blood.
4. A sense of fullness or heaviness, in the region of the deep urethra, or reflected to the perineum or rectum, is very common. This is particularly marked during or after coitus, and during ejaculation sharp pain may be felt in this location due to a stenosed condition of the puncta jacularia. The sexual apparatus usually shows some evidence of irritability.
5. Frequent and prolonged erections without sexual or mental excitations are not uncommon.
6. Pollutions may be frequent; the continued engorgement of the structures involved tends to increase the inflammatory process. Later, the opposite train of symptoms becomes apparent. Loss of sexual desire, weak or unstable erections with premature, delayed or incomplete ejaculations.
7. Pruritus ani is not uncommon.
8. Hypochondriasis is quite frequent, as before stated.
9. Shreds in the urine are inconstant; they may be absent today and present tomorrow.
10. Discharge, principally of mucus plus epithelium, is commonly observed and noted with suspicion by the patient.
11. Examination per rectum will in a few cases show vesiculitis seminalis and prostatitis, either or both, and these conditions should first be corrected.

The malady is most common in bachelors, and is usually due to unsatisfied desire or masturbation. The diagnosis is readily made with the urethroscope. Hawkins treats such cases by direct applications of 15 or 20 per cent silver nitrate. To relieve the burning following the application, he instils some charcoal filtered cylinder oil. He also recommends the Oudin high frequency current applied through a Wappler cystoscope. The prognosis is fairly good. Hawkins admits that some cases are incurable by these methods of treatment.

#### **Circumcision in the Masturbation of Female Infants.**

ROWLAND G. FREEMAN, New York. *American Journal of Diseases of Children*, August, 1914.

The author believes that not enough attention has been paid to masturbation in female infants. The condition is usually due to an adherent clitoris, which is often completely buried in the prepuce. The simple breaking up of the adhesions is very painful and often leads to no result since the adhesions reform in a short time. The author therefore advocates a complete removal of the foreskin of the clitoris and cites cases in which this operation has been of lasting benefit.

#### **The Serum Diagnosis of Gonorrheal Infection.** R. L. JONES and I. SIMONS, Nashville, Tenn. *The Urologic and Cutaneous Review*, July, 1914.

This is an analysis of 206 cases in which the specific serum reaction for gonorrhea was studied. The paper deals with the clinical results, not with technic. The authors conclude that: 1. The test is even more accurate than the analogous Wassermann test for syphilis. 2. It is of the greatest value in chronic cases where the gonococci are found with the greatest difficulty. 3. One hundred per cent of positive results are obtained in cases presenting complications of urethral gonorrhea. 4. Chronic uncomplicated gonorrhea gives a positive reaction; this disappears when the case is cured. 5. No non-gonorrheic has given a positive test. 6. A negative blood test is advisable in a candidate for matrimony who gives a history of previous gonorrheal infection even though apparently cured.

#### **Treatment of Unlocalized Intracranial Injuries Through a Subtemporal Approach.** V. P. BLAIR, St. Louis. *Journal American Medical Association*, September 5, 1914.

Blair advocates for the treatment of cases of intracranial injuries where the local lesions cannot be directly determined, the use of single or bilateral subtemporal decompression and drainage of the subdural space. The operation is easily and quickly performed, leaving the defect in the least exposed position and protected by the temporal muscle. With the finger in this opening a large part of the orbital surface of the frontal lobe, the under surface of the temporal lobe and a fair part of the convexity of the hemisphere and inner surface of the skull can be explored. Clots and also pulped parts of the under surfaces of the temporal and frontal lobes can be withdrawn so that the drainage prevents a further accumulation of blood and rapidly clears the cerebrospinal fluid. If a disinfectant, such as hexamethylenetetramine, is used, the drainage of the cerebrospinal fluid insures its dissemination throughout the several subarachnoid spaces, and finally the operation allows for a certain amount of expansion of brain, insuring a freer circulation and possibly accommodation for a hidden clot. Blair reports experiments on animals in which, however, the human conditions could not be exactly duplicated, and gives the statistics of this operation in the City Hospital, St. Louis, for the two years, 1910 and 1912. In sixty-three patients not operated on who lived more than two hours, 35 per cent survived as against 57 per cent of those operated on. The series of operative cases is too small to afford statistical conclusions of value, but he has lately made comparisons between these results and a running series of eighty basal cases not operated on in another service. In these there were seventeen deaths within two hours after injury, leaving sixty-three in which there was a survival for two hours or more. In this non-operative sixty-three only 35 per cent survived. The time of operation is important. In half of the successful cases, but in only one-third of the fatal cases, the operation was done within two hours after the injury. Next to disturbance of the sensorium the most constant single sign of severe brain injury was disturbance of the pupillary reflex. Of patients giving this sign in the series without operation, 27 per cent recovered; in the series with operation, 57 per cent. After watching the operated series here presented, he concluded to open subtemporally every skull seen early with supposed unlocalized brain injury and believes it is a good procedure. He describes the technic, which is simple. If carefully and gently done, he does not believe it is liable to produce any real damage. It might hasten death by a few hours or minutes of a patient with rupture of one of the large cerebral arteries, but such a patient would be unconscious and already doomed.

#### **A Few Practical Points on the Treatment of Leg Ulcers.** A. RAVOGLI, Cincinnati. *Journal American Medical Association*, August 1, 1914.

Ravogli gives some practical points on leg ulcers. Their causes may be traumatism, constant irritation, mechanical, bacterial, dynamic, electrical action, or all com-



bined, producing infiltration and molecular disintegration of tissues and resulting ulcer. In many cases occupation requiring long standing, etc., may be the cause. The relation of ulcer to varicose veins is still in dispute as it does not follow varicosity in all cases. The gouty diathesis, trophoneuroses, and local asphyxias have been suggested as causes. Bacteria have been found in Ravogli's examination, most frequently *B. pyocyaneus*. The process is one of infiltration and softening of tissues cutting off the nutrition, invasion of bacteria, gangrene and sloughing. The three periods of necrosis, sloughing and reparation should guide the treatment. The first period is marked by acute inflammatory symptoms. The patients usually go to the druggist and ask for a salve which relieves the pain but makes the condition worse, by obstructing the sloughing off of the gangrenous masses retaining the bacteria-laden secretion and increasing the inflammation. The best application for this period is water at 80 or 90 degrees temperature and containing some antiseptic preparation. Ravogli uses sodium bicarbonate or baborate in the water. If the ulcers are very foul solutions of mercuric chlorid, from 1 to 5,000 to 1 to 2,000, either as a continuous bath or in moist compresses. But as soon as the odor has been overcome he goes back to the bicarbonate or baborate solution. In some cases, especially when *B. pyocyaneus* is present he has found phenol useful, in warm water. If the patient can be recumbent with the leg elevated the pain and inflammatory symptoms will subside sooner and the ulcers show a clean surface with healthy granulations. In this condition it needs to be dressed with some remedy which will cover and protect the granulations and remove the secretions and keep the surface sterile. One of the oldest standbys has been a mixture of castor oil and from 10 to 50 per cent of balsam of Peru. When this is irritant he changes it for some more suitable application. Many remedies which favor the granulation delay the formation of epithelium and for this remedies producing oxygen seem to be called for. For many years Ravogli has used diachylon salve containing 1 gram of ichthyol to the ounce. He still uses this in obstinate cases, but in ordinary cases he finds useful petrolatum with 2 per cent boric acid on a piece of lint changed twice a day. Various preparations have been recommended by authors some of which are mentioned. Ravogli objects to the use of thick paste. During the process of repair it must be aided by proper measures. Internal treatment must be given according to the condition of the patient. In his hospital service he always advises the use of potassium iodid, knowing that phlebitis is often originated, maintained and aggravated by a leucic taint. An alkaline purgative is recommended when constipation is present and there is some gouty tendency. In case of anemia from poor nutrition proper remedies should be given. After recovery to prevent relapse he advises the patients to bathe the legs twice a day, to massage the affected leg with 2 per cent alcoholic solution of phenol and when dry dust it with rice powder or talcum powder, also to wear during the daytime a well-fitting elastic stocking.

**Remarks Upon the Effects Observed in the Use of Mixed Toxins (Colby) in Certain Cases of Sarcoma.** T. W. HARNER, Boston. *Boston Medical and Surgical Journal*, August 13, 1914.

Harner's conclusions are based upon observation of 91 cases; for various reasons, only 32 of these cases are valid to determine the end results.

1. The treatment of primary or recurrent inoperable sarcoma with mixed toxins must be intensive. The severity of reactions may be lessened by certain measures and I see no contraindication to such humane practice. The increment of dose and the interval between injections requires some experience but, even after a considerable experience, this method of treatment is always uncertain.

2. This method of treatment is so uncertain and so distressing that,

(a) Its institution is unjustifiable in any case in which operative measures of reasonable safety offer possible hope of removal.

(b) A frank statement of the nature and severity of the reactions and the possibility of benefit should be made

to the patient or some responsible person before treatment is instituted.

(c) It should be instituted in no case unless proven microscopically to be sarcoma.

(d) Its institution is unjustifiable in all cases of inoperable sarcoma.

3. The percentage of apparent cures may be regarded as varying from 9.4 to 18.8.

4. This study suggests that the toxins offer no expectation of benefit in cases with multiple melanotic growths, in cases with mixed cell growths, in cases with intra-abdominal growths, and in cases with growths arising from subcutaneous tissue or bone, excepting perhaps giant cell growths. It suggests that they may be legitimately tried in cases with single melanotic growths. It suggests that they are apparently of value in cases with sarcomata arising in nose and accessory sinuses, whether spindle cell, giant cell, or round cell.

5. The operative treatment of true giant cell tumors gives in the majority of cases such good results that the toxins are not indicated. Their use is, however, warranted in those cases in which the growths are so situated that complete surgical eradication is impossible (such as giant cell tumor of the spine) and in these cases, I believe that the attack should be primarily surgical, followed immediately by toxin treatment.

**The Significance of the Thymus Gland in Graves' Disease.** W. S. HALSTEAD, Baltimore, *Bulletin of The Johns Hopkins Hospital*, August, 1914.

In this paper, which was read before the Harvey Society in New York Halstead discusses the relation of the thymus gland to the symptoms of Basedow's disease. Especially within the past few years has attention been called by several European surgeons to the fact that in many cases of Graves' disease the thymus gland is pathologically enlarged. Garré and Capelle have shown that after thymus extirpation the blood picture returned to normal exactly as after strumectomy. The juice expressed from an enlarged thymus, when injected into animals, produces the Kocher blood picture. Prompt implantation of normal thymus in thyroidectomized dogs prevents the appearance of cachexia strumipriva. Typical Basedow symptoms have been produced by the intraperitoneal implantation of hyperplastic thymus.

These facts all go to prove the close relation existing between thymus and thyroid. Within the past year von Haberer has reported quite wonderful results in several cases of extremely severe Graves' disease in whom removal of a portion of the enlarged thymus led to a prompt recovery in apparently hopeless cases.

Halstead reports two cases of his own in whom portions of the thymus were removed together with partial thyroidectomy. Both cases were greatly improved, though it is not possible to say how much was due to the thymectomy. The results of the combined operations have been, without exception, remarkably good; unmistakably better than when the thyroid alone is operated upon. Particularly striking has been the relative absence of the reaction which is usually observed in the 36 or 48 hours following thyroid lobectomy.

The Roentgen-ray and the percussion note over the area occupied by the thymus may give useful information; but the absence of both dullness and shadow does not exclude the persistence of the gland, nor do we know as yet how small a thymus may be responsible for the symptoms. It has been estimated as a result of non-operative clinical investigation that in about 40 per cent. of all cases of exophthalmic goiter the thymus is persistent.

The exact relationship existing between the thymus and thyroid glands has not yet been determined, though there is much evidence being brought forward that the former may be more closely associated with vagotonic symptoms, the latter with sympathetico-tonic.

The author believes that in severe cases after tying off the arteries, thyroid lobectomy should be done, and that if one is confronted with an enlarged thymus, a partial resection of the gland is indicated.

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## FEMUR FRACTURES: STATISTICS OF END-RESULTS.\*

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The educational value of fracture statistics to our profession, to the Workmen's Compensation insurance companies, and to the public is just being taught, and when fully understood and appreciated, it will very materially improve the efficiency of our treatment of fractures.

Wherever one studies the statistics of accidents it is universally found that collapse of structure and falls of materials cause the larger number of accidents, and the results of these accidents are wounds and fractures. The relative severity of these injuries is best illustrated by the consideration of the time lost as a result of them, and the highest average loss shown by any of the injuries is due to fractures.

To illustrate with a specific example from the 1913 Annual Report of the Industrial Insurance Department of the State of Washington: 12,380 cases of accidents received \$465,000 compensation for 340,000 days of disability. Among these were 1,383 cases of fractures which received \$122,000 for 90,000 days of disability; that is, the fractures, which constituted only 10 per cent. of the total injuries, received 27 per cent. of the total compensation. Furthermore, 266 cases, or 20 per cent., of all fractures still suffered some permanent partial disability. Similar conditions could be shown wherever accurate detailed records have been tabulated, but in this country, up to the present time, there are scarcely any similar statistics. However, experts for the Workmen's Compensation commissions will secure such statistics during the coming years. When these facts become sufficiently widely known and understood, employers of labor who must actually pay the costs of compensation, will demand that the present length of disability be diminished. This has become a question of economics and we must thoroughly appre-

ciate that compensation laws will demand the same increased efficiency from our methods of treatment as is being secured in all other branches of industry.

Many surgeons feel that numbers of the "bad set" fractures which become useful only after twelve to eighteen months might be just as good after four to six months, if more efficiently treated. During the last two years, as our profession has been more carefully investigating the end-results after fracture, surgeons have become *convinced* that the *results must be improved*. The public, since the advent of *x-rays*, has become better educated and are demanding shorter and more efficient treatment, a briefer period of disability with better functional results.

Up to the last three years the general profession believed that fractures were being treated satisfactorily. This was due to the fact that the surgeons did not follow up their patients to the end, and therefore were ignorant of the final results. A few surgeons who kept patients under careful observation for longer periods became convinced that the average results were very unsatisfactory. They believed these bad results were due to inefficient treatment, but their conclusions are not generally accepted and will not be approved until demonstrated by a large mass of reliable statistics collected from various sources. The wide experience of many surgeons must thus be brought together in an authoritative form, and subjected to critical analysis to disclose all the results under past and present methods.

It therefore becomes most necessary to establish authoritative standards by which subsequent fracture work can be measured and compared. Only in this way can the average duration of disability be determined. This will become of great value both for the instruction of lawyers and courts and for the protection of the surgeons.

The Fracture Committee of the American Surgical Association earnestly desires every surgeon to report before May, 1915, all fractures of the lower extremities in which the final *result is definitely known*.

Every surgeon knows when discussing present standards that wide discrepancies are glaringly apparent. If one would learn about fractures he

\*Read before New York and New England Association of Railway Surgeons, Oct. 21, 1914.

should not read books, but visit the law courts and listen to an unfortunate doctor explaining what a "satisfactory result" is. This too elastic phrase has become obsolete, for it did not conform to any uniform standard.

Fracture of the femur occurs in about ten per cent. of all fractures and offers by far the greatest difficulties in its treatment. As its injury most seriously incapacitates the workman, it is of unusual importance to investigate the end-results of the present methods of treatment and to suggest how these may be improved.

The following authorities present the statistics of end-results which are at present most available for study:

1. Von Bergmann reports 121 cases in which 39, or 32 per cent., fully recovered, the average period of disability being 54 weeks.

2. The British Fracture Committee reports 727 cases, of which 298 were over 15 years of age. Of 87 fractures of the neck, 20, or 23 per cent., recovered good function; of 49 fractures of the upper third, 23, or 47 per cent., recovered good function; of 108 fractures of the middle third, 53, or 49 per cent., recovered good function; of 54 fractures of the lower third, 30, or 55 per cent., recovered good function.

The 126 cases including all groups averaged only 42 per cent. of good function.

In 179 cases the average period of disability was 33.6 weeks. In 21 cases, or 11 per cent., the disability was permanent.

3. Scudder reported 35 cases, of which 16 were adults (between 18 and 48 years of age). Of these, only 5, or 31 per cent., were perfect. The working capacity of the remaining 11 was depreciated by limited knee-joint movements, pain after working, lameness in walking, weakness in the whole leg, and lack of endurance.

4. Hitzrot reported 20 adults between 15 and 76 years of age. Of 16 cases treated by non-operative methods, 15 recovered perfect function within 52 weeks. In 4 cases where the overriding could not be reduced, operation was performed and good function was secured within 52 weeks.

5. Ashhurst traces 21 cases out of 58 treated in the Episcopal Hospital, Philadelphia. Five recovered perfect function, 8 others were able to work but still limped, so he concluded 13, or 62 per cent., secured useful limbs. However, of these 21 cases, 11 were under 16 years of age.

6. Faltin, after studying the compensation awards made by the insurance companies in Sweden, reported the average period of temporary disability

at seven months and that partial disability continued for three to four months longer.

The above statistics have been collected from surgical literature and we already see that the widest variations and obvious inaccuracies exist. Thus far, the different states have not yet classified their statistics sufficiently to give the data of different fractures, such as femur, tibia, etc. In 1912, Minnesota published its 13th Report of the Bureau of Labor. In 1,230 of the various fractures recorded during 1910, 1911, and 1912, under the compensation law, 467 were classified as fractures of the hip, thigh, knee, and ankle. No statement was made regarding the percentage of good results. In only 516 out of the 1,230 cases was the length of disability recorded, but it was stated that in *only* 13 cases was it more than 24 weeks and *no* case exceeded 36 weeks.

The above-mentioned Washington insurance report states that of 67 cases of fracture of femur, 53 of which were treated without operation averaged 158½ days of disability and 14 cases treated by operative methods averaged 209 days.

Unsatisfactory and disappointing as these statistics are, how very startling are the following which have been followed up most scientifically by the Austrian government in obedience to the requirements of the insurance societies in 1911. These records are of the greatest value and tell a different and sadder story than that of our incomplete and inaccurate professional records. There were 857 fractures of the femur, of which 153, or 17.8 per cent., recovered with only temporary disability, but the length of this disability is not stated; 683, or 79.7 per cent., suffered some permanent disability; 99 had a loss of 9 to 19 per cent. of their earning power; 120 a loss of 19 to 32 per cent.; 134 a loss of 33 to 48 per cent.; 330 a loss of over 50 per cent.; 38 per cent. of all cases suffered a loss of 50 per cent. earning power.

It is now very evident that it is impossible from all these confusing statements to determine an accurate standard for the duration of disability. We must first accurately record and follow up to the end our own cases to learn the results of our own methods. The more carefully fracture patients are followed up, the more astonished we are to learn how many men are permanently more or less disabled and how rarely ideal functional results are secured. All general hospital records are notoriously inadequate, for the end-results are seldom stated. Patients are discharged as cured when they leave the hospital at the end of eight to ten weeks, although they go away on crutches. True,

the bone has united, but normal function has not been restored—the patient has not yet regained his earning power.

It is gross ignorance of the whole problem of industrial accidents to confuse the surgical and economic results of an injury. From the point of view of an editor, a fractured collar-bone is a minor accident, though it may interfere with a successful game of golf. But to a manual laborer, the collar-bone is the mainstay of his working mechanism upon which a good deal of strain falls, and long after surgical union has taken place, the mechanism remains weak and defective. Among 742 fractures of the collar-bone in Austrian workmen, occurring in five years, 1897-1901, 372, or just 50 per cent., resulted in permanent partial disability, and of these 60 were impaired up to one-half or more of their previous earning capacity.

Hereafter, under the compensation law, it will be necessary to determine the length of the period which elapses between the accident and the date on which the patient is able to resume his customary normal work, and our profession must recognize this as the approximate period required to regain normal function.

The purpose of this paper is to impress upon our profession the urgent necessity of very materially shortening the present period of duration of disability.

Compensation will demand improved standards. The end of the present régime is rapidly arriving, for the radiogram has forced surgeons to appreciate keenly how bad the results are when treated by the average methods.

Wherein lies the inefficiency of these methods?

Recently, in gathering statistics for the Fracture Committee of the American Surgical Association, I tabulated the histories of 340 fractured femurs collected from several different hospitals.

The records indicated that traction was but rarely applied under 12 hours, and, in less than 5 per cent., under 24 hours; furthermore, when applied, the weight was generally insufficient, the amounts being frequently stated as 10, 12, or 15 pounds. When Buck's extension was used, the foot of the bed was occasionally raised, but *seldom* was direct perineal *counter-extension* employed. Reduction under anesthesia is not stated to have been employed in more than 16 per cent. Radiograms showed overlapping and angulation in the largest number of cases.

In this connection it is interesting to note the replies received three years ago from 92 surgeons in Canada and the United States. Sixty-nine thought that 1 inch of shortening was permissible

after the fracture of the femur; 19 thought that not more than  $\frac{3}{4}$  inch, and only 4 thought that not more than  $\frac{1}{2}$  inch could be permitted. To-day many of the first group have changed their opinions and agree with the last group.

Many of these bad results are avoidable, as they have been due to neglect and lack of efficient treatment, for the patients have been left to the care of junior house officers.

The demand for general operative cases has crowded fracture cases out from the hospital wards. A plaster of paris cast has been applied and the patient has been discharged or transferred to another hospital. At one period, 50 per cent. of the fractured patients admitted to Bellevue Hospital had been transferred from other hospitals.

Great improvement, even 25 per cent., will surely follow if treatment truly intelligent, prompt, and efficient be employed, the most important factor being that it must be efficient *from the very first* and there must be no delay.

(1) *Reduction* must be thorough, and in the larger number of patients *anesthesia* will be required.

If seen early enough, end-to-end apposition should be secured in many of the transverse and oblique fractures. Formerly it was supposed that spiral fractures of the femur were the most frequent, but analysis of the radiograms of 100 femurs showed 32 spiral, 50 oblique, and 18 transverse.

In this connection I would say that manufacturers are developing a fluoroscopic apparatus which, when perfected, will enable one with a suitable extension apparatus to accurately reduce many of the oblique and transverse fractures.

(2) *Traction*. Immediately after reduction a sufficient amount of traction must be applied and maintained long enough to secure correct fixation of fragments. Generally it is too small and frequently it becomes intermittent and irregular, so that often angulation occurs, even after the first radiogram has shown the fragments in good alignment. The muscles subsequently contract and produce too much movement of the fragment with overriding and shortening.

Traction, to be efficient, must be powerful enough and the force must be applied in the right normal direction to overcome the pull of all the opposing muscles. Shortening is thus obliterated and correct alignment is secured.

The ideal results obtained by Bardenheuer were due to his thorough application of this most important principle in all his practice.

In fractures of the femur, especially of the shaft,

traction that maintains correct alignment will also at the same time secure good anatomical position. This corroborates the findings of the British Fracture Committee—that where the anatomical result is good, then the functional result is good in 90.7 per cent.; but that when the anatomical result is moderate or bad, then a good functional result occurs in only 29.7 per cent. It is therefore of the highest importance that the surgeon secure anatomical reduction.

Bad results are nearly always associated with angulation and are largely due to that cause. This is conclusively demonstrated by the study of any large series of radiograms. Angulation results from ineffectual traction.

In children, traction is much more easily applied and far better maintained; the muscles are less resistant, the weights smaller; the child is lighter and smaller and more easily lifted into correct position by one nurse or attendant house officer, consequently normal alignment is more often maintained. These facts largely explain why the results are far better in children than in adults where traction is far more difficult to maintain.

Under 15 years of age, in 1,016 cases, good functional results were obtained in 90.8 per cent.

Over 15 years of age, in 1,580 cases, good functional results were obtained in only 45.4 per cent.

(3) *Radiograms* must be systematically employed in all cases of fracture of the femur to control the results of reduction. While some may be misleading, yet when made by a qualified operator, they furnish the best records of the relative position of the fragments and they give invaluable assistance in showing how unsatisfactory results may be improved.

Hereafter, in seeking compensation, the patient will surely secure a radiogram, so it is therefore advisable for the surgeon to have previously fortified himself. Courts have generally decided to accept radiograms as evidence. I therefore thoroughly agree with Estes that no physician should undertake the care of a fractured femur unless he can have the benefit of the assistance of a radiogram.

In this connection I believe the time will come when metropolitan hospitals will become so organized that fractures will be assigned to especially equipped wards under the care of surgeons who are particularly interested in the treatment of fractures.

Further, I believe it would be most advisable, both for the future welfare of the patient and also for the economy of employers, that they should

require that all fracture cases be sent to hospitals having x-ray equipments and extension apparatus and where skilled surgeons should treat them, rather than the company surgeons in their own homes.

(4) *Consolidation.* This period is subject to considerable variation, for the academic period stated in text-books cannot be depended upon, as experience proves that quite a percentage require additional time for complete consolidation.

It therefore happens that when the body weight is carried too early on the recovering femur, bending begins, and if continued, marked angulation and deformity occur.

Again, it is in just these cases that the radiogram is of so great assistance, for it comes to help us before it is too late.

(5) *Operation.* Recently sufficient evidence has been presented to definitely recommend operations by skilled hands for fractures of the femur in the cases where reduction is inadequate. Adequate reduction requires that the ends remain in apposition without obvious angulation or axial rotation, and that the shortening be not greater than  $\frac{1}{2}$  inch.

Many surgeons who have had special experience in the treatment of fractures have learned to consider that certain kinds of fractures presenting characteristic radiographic evidence are best treated by operation. In these selected cases after the clinical diagnosis has been confirmed by a radiogram, then the decision is made to operate at once, for here, as elsewhere, operative methods to be successful must be efficient from the first.

"If a surgeon is doubtful whether he can treat a fracture efficiently by a non-operative method, he ought to consider whether he cannot do better by operating at once. He ought not to say, 'We can see what becomes of it and if it is not satisfactory we can operate later,' for by so doing the opportunity of getting a good functional result may be irretrievably lost."

The British Fracture Committee reported that when operation was too long delayed the prospects for good results were sacrificed.

In 147 cases in which primary operation was decided upon, good function was secured in 80 per cent. In 78 cases in which operation was resorted to only secondarily after failure of other treatment, good function was secured in only 60 per cent. In 83 cases in which operation was performed still later on account of malunion, good function followed in only 38 per cent.

The above statistics are corroborated by a series

of 37 cases of fracture of the femur collected by the writer.

In 10 cases of primary operation, good function resulted in 80 per cent.; whereas in 27 cases of secondary operation, good function was secured in only 60 per cent. However, the average of good functional results obtained by these operations was 65 per cent.; much in contrast with the 42 per cent. obtained by non-operative methods in the cases collected by the British Fracture Committee.

As both the American and English series of immediate operation were followed by good functional results in 80 per cent. of the cases, it is quite evident that the present results can certainly be improved from 35 per cent. to 50 per cent.

That delay in operating is very general, even among our own surgeons, is indicated from the fact that among 388 cases of operations collected from members of the American Surgical Association, only 78 cases, or 20 per cent., were operated upon immediately; 310 operations were performed only after other methods had failed.

Of these 388 cases of operations, 143, or 37 per cent., were for fractures of the femur. It is therefore certain that surgeons are favoring more and more operations for fractures of the femur. Results warrant the belief that operations are indicated upon the femur in fractures of the upper and lower thirds when the fragments are much displaced, as they frequently are, and in spiral fractures of the shaft, for it is just this class of cases which uniformly give the poorest results following non-operative treatment.

Finally, in the treatment of fractures of the femur many surgeons are now experiencing similarly unsatisfactory results, as they did fifteen years ago, when they postponed the time for operation in acute appendicitis and in gastric and duodenal ulcers with perforation. The same brilliant results that followed immediate operation in the above cases will likewise follow prompt operation in selected cases of fracture of the femur.

The number of operations will surely increase, but the larger number of fractures will be treated without operation, and the lesson to be constantly taught is *efficiency, efficiency* in every detail from *the hour of the accident*.

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## CONCERNING MIXED TUMORS OF THE KIDNEY.

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There is perhaps no more interesting and fruitful field for the study of varied morphological tissue complexes, and for the investigation of the pathogenesis of neoplasms than that afforded by the so-called "mixed tumors" of the kidney. Birch-Hirschfeld was one of the first to call attention to the fact that, in the case of the testicle, the many combinations of mixed connective tissue and epithelial growths should all be thrown into a common group. So, also, was this author sponsor for a similar hypothesis in his classification of the remarkable admixtures of heterogeneous elements encountered in the mixed tumors of the kidney.

Although our knowledge of this subject has been considerably clarified through the work of Wilms and other authors, some of the mooted points in the origin of these tumors still require explanation, and it would seem, therefore, not amiss to report any observations tending to throw light on this interesting subject.

The hypothesis that these growths are the result of the development of rests of the Wolffian body has been suggested by many authors. Were it not for the presence of the striped muscle elements and cartilage as frequent and striking constituents—tissues that could not be derived from the Wolffian body—the theory would have the weight of embryological evidence in its favor. On the other hand, the close proximity of the Wolffian body and the metanephros in the fetus, makes the view of the existence of fusion of the two with inclusion into the kidney of the parts of the former, an enticing explanation.

When we recall that characteristic for the mixed tumors of the kidney is the simultaneous occurrence of two or more varieties of derivatives of the mesoderm, including smooth and striped muscle, cartilage, fat, elastic fibers, myxomatous and fibrous connective tissue—together with the inclusion of certain epithelial elements—and when we remember that many of these are *not* constituents of the Wolffian body, we are forced to seek elsewhere for satisfactory elucidation of the problem of origin.

It is to Wilms that we owe the very plausible theory that all the elements in question owe their derivation to a common *Anlage* which may be assumed to be mesodermal, including cells going into the formation of the mesodermic somites (Myotom), intermediary cell mass (Mittelplatte) and



scleratogenous layer (Sclerotome) of the mesodermal somites.

Let us keep in mind that practically all mixed tumors of the kidney are composed of various elements, amongst which are glandular tissue, smooth and striped muscles, cartilage, fat and elastic, myxomatous and fibrous connective tissue. For the production of such a complex, we must needs look for an embryonal tissue in which resides the potentiality of elaborating all these varied tissue types.

In order that this hypothesis may be clear, let us recall certain elementary, embryological facts in the development of the mesoderm and of the kidney.

For our purpose it will suffice to begin with that stage in which the development of the mesodermic somites and lateral plates occurs. From the mesoderm are formed two thickened bars of mesodermal

tains cells that undergo histological differentiation and are utilized in the formation of the cutaneous tissues, the connective tissues, smooth muscle and bone. From this mesenchyme, according to Hertwig, originates myxomatous, fibrillar, cartilaginous, osseous types of connective tissue, the lymphoid apparatus, smooth muscle and possibly even vessels and blood.

Later in development, we see the intermediate cell mass separated from the mesodermic somites and find it transformed into an elongated body, the primitive kidney (Fig. 2). We know that the Wolffian body, or mesonephros, is developed in this intermediate cell mass by the growth of a number of transversely arranged tubules.

Recapitulating, we note the myotome affording the possibility of origin of *striped muscle* fibers, the

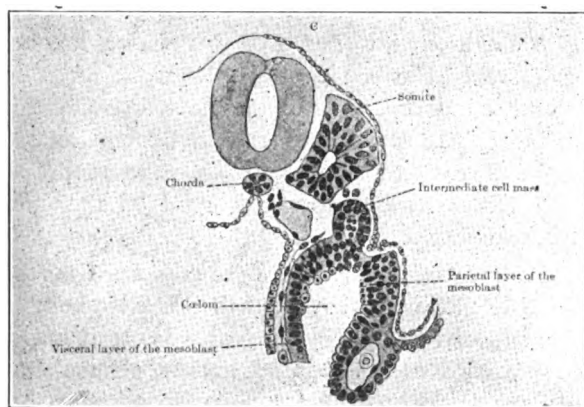


Fig. 1. Transverse section through the tenth pair of somites of the embryo, showing somite and intermediate cell mass (after Kollmann).

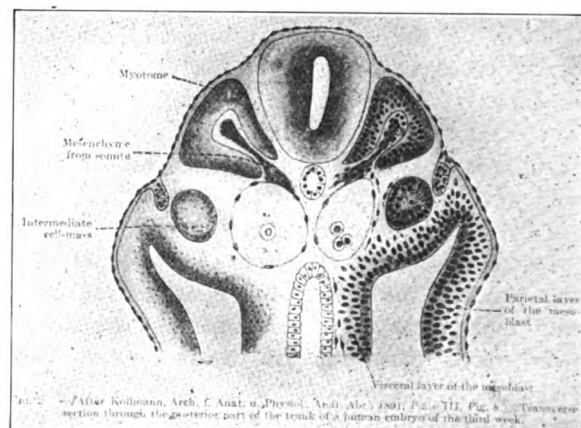


Fig. 2. Transverse section through the human embryo of the third week, showing myotome, mesenchyme, etc.

tissue, making the paraxial mesoderm, whilst the more laterally situated portions of the mesoderm are known as the lateral plates (Fig. 1). By division of the paraxial mesoderm, a series of cubical masses is produced, termed the *mesodermic somites*. Then a separation of the mesodermic somites and the lateral mesoderm presents itself through the appearance of furrows, the connecting strand of cells being known as the *intermediate cell mass* (Fig. 1).

Each mesodermal somite consists of numerous cells (myotome), arranged around a central cavity which soon disappears. The cells of the somites are gradually arranged into three sets, the *muscle plate* (myotome) (Fig. 2), the *scleratogenous* (sclerotome) layer and the subepithelial or *cutaneous lamella*. The cells of the muscle plate layer lose their epithelial-like character and give rise to the striped muscle of the body. The scleratogenous layer is responsible for many of the skeletal tissues, including, of course, the production of cartilage. The *cutaneous lamella* (mesenchyme) (Fig. 2), con-

sclerotome (scleratogenous layer) for *cartilage*, the mesenchyme for the various types of *connective tissue*, including *smooth muscle* and *possibly vessels*, and the intermediate cell mass for the *glandular* or *epithelial* formations.

It would seem most probable that in the intermediary cell mass (Mittelplatte) in the myotome, and in the mesenchyme, all of which are in close proximity and relation in the embryo, must be sought the origin of the mixed tumors of the kidney.

The case to be reported is instructive in that it concerns a renal tumor containing only adipose tissue, fibrillar connective tissue, smooth muscle and vessels, a combination which is unique—as far as we know—and which still further supports Wilm's contention as to the origin of these growths.

In a kidney removed by one of us for calculi and hydronephrotic changes, a small tumor of the cortical substance was accidentally encountered, the gross and microscopic examination of which revealed the following:

Specimen—Kidney from R. S. (referred to Dr. Buerger by Dr. N. E. Brill). is markedly enlarged, almost twice the normal size, showing the usual hydronephrotic changes accompanying multiple branching calculi in the renal pelvis. There is a fairly marked degree of perinephritis with dense adhesions and the peri-pelvic fat is hypertrophied to the extent of the production of a veritable "hilus lipoma" (Fig. 3). Protruding from the convex border near the upper pole is a hemispherical mass covered with capsule, to which it appears to have given a purplish hue. On section, through the center of the growth, a well circumscribed, circular surface, about 14 mm. in diameter, is revealed. When the surface is scraped, a cribriform appear-

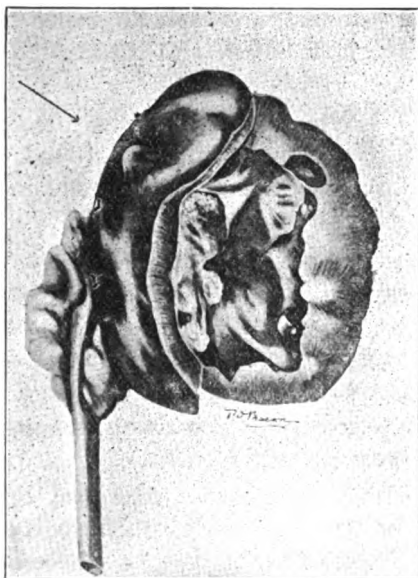


Fig. 3. Hydronephrotic kidney with small tumor on the surface.

ance is produced suggesting cavernous angioma. The mass is soft, can be easily separated from the renal capsule, but is firmly imbedded and adherent to the cortical parenchyma (Fig. 4). Histologically, three different tissues seem to constitute this tumor, adipose tissue, bundles of smooth muscle fibers and vessels. In places the vascular elements seemed to preponderate and the picture is not unlike that of an angioma, containing large thin-walled vascular spaces, intercommunicating, partly separated by connective tissue and smooth muscle fibers, in places showing inclusions of fat. Here and there, the vessels have undergone hyaline degeneration, and at times show considerable thickening of the intima with a tendency to obliteration of their lumina.

As for the smooth muscle tissue, this is either sparsely distributed between the bloodvessels and in the fat, or is collected in bundles of considerable size, which seem to run in various directions, as evidenced by the various pictures afforded by a single section. In the periphery of the growth, where it comes into contact with the renal parenchyma, there are signs of more rapid proliferation of the smooth muscle cells. Here they are not as yet completely developed, being small and apparently undergoing

division. The contiguous renal tissue is correspondingly attenuated, being compressed and atrophic. Many of the glomeruli have undergone hyaline degeneration, and the tubules have become distorted and atrophic.

We have here, then, a tumor which is unique in many respects. Its small size, the age of the patient—37 (since children are usually affected)—its lack of gross and histological evidences of malignancy and the character of its constituent elements, at once set it apart from the most of the mixed tumors of the kidney, previously reported. It is particularly interesting to note that only such tissues are in-

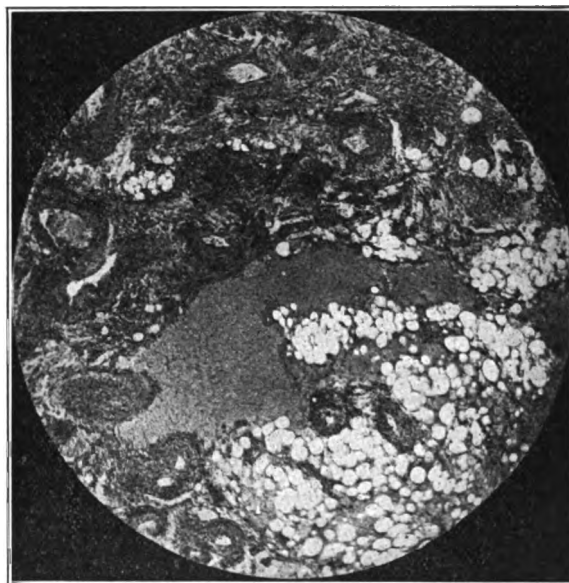


Fig. 4. Photomicrograph of the mixed tumor; above, vessels, smooth muscle, fat; in the middle, vascular spaces; below, fat.

cluded as could be derived from the mesenchyme, the intermediate mass or Wolffian body being not at all represented. This circumstance speaks, we think, in favor of the correctness of the assumption that the mesodermal somites, with possibly the intermediate cell mass, is responsible for the origin of the mixed tumor, the theory that rests of the Wolffian body are wholly engaged being untenable.

For those interested in a recapitulation of the more important examples of mixed tumors of the kidney reported in the literature, the following summary of 40 cases may be of interest.

I. So-called adenosarcomata with epithelial elements, with or without muscle and cartilage.

Case 1.—Adenochondrosarcoma (Perthes, 1896).

Case 2.—Adenosarcoma (Volger, 1897).

Cases 3, 4, 5.—Adenosarcoma with myxomatous stroma; patient's age  $4\frac{1}{2}$  years. Round celled adenosarcoma; age 3 years. Round called adenosarcoma; age 3 years (Heineke, 1897).

Cases 6, 7.—Adenosarcoma containing fat, car-

tilage, elastic and fibrous tissue; age 11 years. Adenosarcoma with striped muscle, rich in glycogen; age 1 year (Wilms).

Case 8.—Adenomatous tumor, consisting of alveoli lined with cylindrical epithelium in a fine stroma of spindle cells; age 7 years (Döderlein, 1897).

Case 9.—Adenosarcoma, composed chiefly of round cells, but containing also spindle and epithelial cells, elastic fibers and smooth muscle; age 2½ years (Paul, 1886).

Case 10.—Vascular, round and spindle, celled sarcoma, containing epithelial lined tubules; age 9 months (Sturm, 1875).

Case 11.—Round and spindle celled sarcoma with adenomatous formations; age 8 years (Schmidt, 1892).

II. Myosarcomata with or without fat and striped muscle.

Case 12.—Bilateral myosarcoma, composed chiefly of bundles of striped muscle in a connective tissue framework, containing blood vessels and fat cells; age 1½ years (Cohnheim, 1875).

Case 13.—Bilateral myosarcoma; age 7 months (Cohnheim and Landsberger, 1877).

Cases 14, 15.—Rhabdomyosarcoma; age 2½ years. Myosarcoma; age 2¾ years (Heineke, 1897).

Case 16.—Myosarcoma, composed of striated muscle and a mixture of spindle and round cells; age 7 years (Bott, 1887).

Case 17.—Myosarcoma with embryonic striated muscle; age 1½ years (Heideman, 1893).

III. Round and spindle celled sarcomata, with or without striped muscle.

Case 18.—Spindle celled sarcoma containing striped muscle fibers; age 1 year (Eberth, 1872).

Case 19.—Small round celled sarcoma with considerable striped muscle, some fat cells and epithelial formations; age 6 months (Marchand).

Cases 20, 21.—Two cases of round celled sarcoma with striped muscle; age 19 months and 3½ years (Osler).

Case 22.—Polypoid spindle celled sarcoma with considerable quantity of striped muscle fibers and epithelial cells; age 4 years (Ribbert, 1886).

Case 23.—Round and spindle celled sarcoma in a myxomatous stroma, which had the chemical properties of mucin; age 2 years (Hanseman, 1894).

IV. Rhabdomyomata.

Case 24.—Rhabdomyoma; age 3¼ years (Hübert-Boström, 1879).

Cases 25-28.—Four cases of rhabdomyoma (Ribbert, 1892).

V. Teratomata and tumors containing adenomatous tissue, spindle cells, muscle and cartilage.

Case 29.—Teratoma composed of sarcoma cells, chiefly giant variety, striped muscle, layers of glycogen, small islands of cartilage and glandular structures (Manasse, 1896).

Case 30.—Embryonic connective tissue, striped muscle fibers without sarcolemma and adenomatous formations, which resembled most the collecting tubules of the kidney; age 3 years (Kocher, 1878).

Cases 31, 32.—Tumor composed of glandular epithelium, smooth and striated muscle, fibrous and elastic tissue; age 6 years. Tumor composed of fibrous and connective tissue, smooth and striped muscle, elastic tissue and cartilage (Wilms).

Case 33.—Round and spindle celled sarcoma, containing smooth muscle and islands of cartilage; age 18 years (Hoisholt, 1891).

Case 34.—Network of connective tissue, muscle and elastic fibers filled with small round, cuboidal and cylindrical cells. Fat cells present in isolated groups; age 3 years (Brosin, 1884).

Case 35.—Glands, smooth and striped muscle, elastic tissue, fat and connective tissue; age 3 years (Wilms).

VI. Round and spindle celled, and alveolar sarcomata.

Case 36.—Alveolar sarcoma with lung metastases; age 2½ years (Borchard, 1893).

Cases 37-40.—Four cases of round celled sarcoma; ages 2 years, 11 weeks, 21 months, and 11 years (Heineke, 1897).

#### TENDON TRANSPLANTATION.

Very ingenious methods have been devised for the attachment of tendons into the periosteum, as in boring a hole through the neck of the bone, as practiced by Jones; or by the employment of iron staples and wire, as advised by Codivilla. A great variety of arrangement may be used in transplanting the tendons. The peroneals may be transplanted to the inner side of the foot; the tibialis anticus may be transplanted to the outside of the foot; the tendo Achilles may be shortened, and the peroneal tendon or a part of the tibialis posticus may be transplanted into the tendon before it is sutured together. The external hallucis may be detached from its insertion and inserted into the neck of the first metatarsal bone, through a hole drilled in it. The semitendinosus in the thigh and the biceps, or the sartorius and the biceps, may be transplanted into the rectus tendon, or by the use of silk attached to the tubercle of the tibia.—JAMES K. YOUNG in *The Lancet-Clinic*.

## SOME OF THE DEFORMITIES FOLLOWING INFANTILE PARALYSIS, WITH ESPECIAL REFERENCE TO TREATMENT.

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The statement accredited to one of the most prominent members of the medical profession in America, that "no treatment is available at the present time for anterior poliomyelitis," has been productive of considerable harm, inasmuch as it has in many instances been the means of preventing the opportunity of instituting the necessary treatment to overcome some of the most common resulting deformities. Although it may be true that no remedy has yet been discovered by the administration of which inflammation of the cord may be arrested and paralysis prevented, this should not be permitted to interfere with treatment and correction of the deformity provided paralysis has already supervened when the patient comes under the observation of the surgeon. In other words, while it may be impossible to prevent deformity by arresting the disease before paralysis has ensued, the fact remains that much can be later accomplished in the way of overcoming the deformity and restoring the function of the paralyzed muscles. It is believed that "far too little surgery is generally done in cases of infantile paralysis, and that nearly all cases can be benefited by properly planned and properly executed operations" (Ryerson).

Therefore, the "human wreckage" caused by anterior poliomyelitis is worthy of the most serious consideration of the surgeon, and the fact that no one appears able to really cure the original disease is no reason for not attempting to make useful, self-supporting individuals out of those who would otherwise be helpless, hopeless cripples—a burden to themselves and the community.

One of the most common deformities following infantile paralysis consists in either partial or complete inability of the patient to control the lower extremities. Whenever paralysis of the quadriceps ensues, of course extension of the leg is rendered impracticable. By transplantation of the biceps femoris tendon into the patella it has been possible to successfully overcome this deformity. In performing the operation great care should be exercised to thoroughly isolate and protect the external popliteal nerve, which on several occasions has been accidentally divided, resulting in paralysis of the peroneal muscles.

In the performance of this operation the biceps

tendon is loosened from its tibial attachment and inserted into the top of the patella; with the foot everted the fascia lata is longitudinally slit and carefully sutured with silk behind the great trochanter. Arthrodesis of the ankle joint is usually necessary to overcome the "flail-foot." Proper braces should be worn until the wounds have healed.

Instead of producing arthrodesis of the ankle joint the following procedure has been recommended: The anterior tendons are carefully separated from the muscles high upon the leg; a hole is drilled through the tibia, the tendon ends being drawn through this and fastened in front of the tibia—some of the tendons being passed through from one side, and others from the other side. The tendons are thus shortened, leaving tendinous structures between attachment and insertion; the tendon thus acts as a ligament, and little or no stretching occurs. If the posterior tendons be also shortened in similar manner, the necessity of arthrodesis is avoided.

After transplanting the biceps tendon as outlined, some surgeons advocate "double fixation" of the ankle joint by means of nails or screws. With the foot in proper position one screw is passed through the external malleolus, astragalus, and calcaneus; the second through the internal malleolus almost at right angles with the first; the third through the scaphoid and cuboid thus "fixing the key of the arch of the foot."

Tendon transplantation was first performed by Nicoladoni, in 1882, for the relief of paralytic calcaneus. Since then Parish, Drobrink, Goldthwaite, Gibney, Whitman, and a host of other prominent surgeons have obtained excellent results from the operation. However, tendon transplantation is indicated only after the final degree of paralysis has been definitely determined, using only such tendons and muscles as have sufficient strength, or it seems reasonably certain can be gradually developed, to do the required work.

Briefly, the essential points as to technic of tendon transplantation and after-care of the patient are as follows:

(1) The surgeon should always strive for perfection in asepsis.

(2) When the tendon is of sufficient length it should be passed through a hole drilled in the bone; if not long enough, include the periosteum when detaching the tendon from its original insertion.

(3) The results are most favorable when the tendon is transferred through the bone.

(4) The next best plan is to transfer a small

piece of bony attachment to the new point of insertion.

(5) The results of one tendon transferred to another are less favorable as there is too great likelihood of stretching.

(6) The tendon should be dissected free for a considerable distance that its new course may begin as high as possible, and thus avoid working at an acute angle, that is its action must be made as nearly normal as possible.

(7) Silk seems to be the suture material of choice, although in many instances an absorbable suture is believed preferable.

(8) The member operated upon should be placed at rest in a slightly over-corrected position for at least six weeks, to prevent strain until the union is firm.

(9) Care in the practice of active motion should be then exercised and a convalescent splint be worn until muscular development in the new position becomes sufficient.

(10) In addition to tendon transplantation the production of arthrodesis is frequently of great assistance, thus partially stiffening the adjacent lax and insecure ankle joint.

In certain instances to overcome the deformity described as "drop-foot," silk ligament suspension instead of tendon transplantation may be advantageously employed. This method of treatment has been rather extensively used by Bradford, Ryerson, and others. The foot is suspended by heavy braided silk cords subcutaneously applied, extending from the tibia downward in front of the ankle to the bones of the foot. The operation is comparatively simple, but the technic must necessarily vary in each case according to the degree of deformity present. The silk is allowed to remain permanently in the tissues, and if the operation has been properly executed a favorable result may be confidently expected to accrue. It is always advisable to close the operative wound in two layers, i.e., suturing the subcutaneous soft tissues over the silk cords separately. A plaster dressing should be applied and permitted to remain for at least six weeks, after which no further external support will usually be required.

Talipes calcaneus, caused by paralysis of the calf muscles, is a disabling deformity which in the majority of instances may be corrected and a useful foot secured by an operation recommended by Whitman, *et al.*, a procedure which has given such universal satisfaction that it is adapted as a routine measure in all such cases, viz., astragalectomy, with posterior displacement of the foot at about five degree equinus. The peroneus longus tendon is

divided about three inches from its insertion and dove-tailed through the tendo achilles, the ends being carefully sutured, thus reinforcing the foot in its backward position. A strong and serviceable foot which continues to develop may be thus secured.

Another deformity of frequent occurrence is paralytic equinovarus. If paralysis is too extensive to be benefited by transplantation, tendon fixation may be practiced as recommended by Gallie, of Toronto, the following technic being employed: A longitudinal three-inch incision is made over the external malleolus; the peroneal tendons are exposed and lifted from their sheaths; a two and a half inch periosteal incision is then made and the periosteum retracted; the bone is removed for the same length as the periosteal incision and the thickness of the tendon to be transplanted; the tendons are drawn taut and placed in this trough, the periosteum being carefully sutured over and to them. For this purpose chromic catgut is used. The tendons become firmly adherent and calcaneus is thus prevented. The patient is able to bear the body weight upon the ball of the foot, raising the heel from the ground, thus greatly improving the gait. The first operation of this character was performed about two years ago. Gallie reports 10 cases, the patients ranging in age from 2 to thirty years. The results obtained have been entirely satisfactory. Many other surgeons have reported favorable results from the Gallie operation.

For the correction of the deformity known as "clawfoot," which is usually the result of infantile paralysis, transplantation of the extensor proprius pollicis to the neck of the first metatarsal bone may be successfully practiced. In this deformity there is not only a marked shortening of the extensors but also the plantar fascia. After subcutaneous plantar fasciotomy a horseshoe incision of the dorsal foot surface is carried to the extensor tendon, and a flap containing all the tissues superficial to this is reflected upon the dorsal surface of the tarso-metatarsal articulation. The long extensor tendon is then detached from its phalange and transplanted into the neck of the metatarsal bone. In aggravated cases, if the deformity be not thus corrected, a wedge-shaped osteotomy through the dorsal surface of the metatarsal bone is recommended.

To illustrate the serious results which may accrue from clawfoot, the history of one case will be briefly related. The patient was a male of 35 years, the deformity having developed 12 years previously as a result of infantile paralysis. No treatment was instituted until he became unable to walk, and there was then extensive bony necrosis originating

in the first metatarsal joint caused by pressure. The man was exceedingly heavy, and practically all of his weight was thrown upon that portion of his foot. Necrosis rapidly developed, and the extensive burrowing of pus had caused such destruction of bony and soft tissues that amputation of the foot became necessary as a life-saving measure. Had this patient been seen early and treated according to the method just outlined, amputation could have been avoided and a serviceable foot preserved.

In conclusion: Under no circumstances should a patient with infantile paralysis be permitted to go untreated, as prevention of deformity is far more important than allowing it to progress, and then by radical means expected to later correct it. For instance, if a child with paralysis of the peroneal muscles—the internal group being normal—is allowed to go without protection or support, the healthy internal muscles rapidly develop and contract, thus forcing the foot into a varus position because there is no resistance from the paralyzed external muscles. The smaller bones of the ankle and foot develop in an abnormal attitude, thereby markedly changing the normal osseous relationship. If the limb is properly supported, deformity is prevented from progressing, and even if later it becomes necessary (which it most likely will) to practice tendon transplantation, the bones are normal in both size and relationship. It is then only a question of the proper support being transferred from braces to healthy transplanted muscles, or power restored by whatever other operation may be selected as most suitable.

It seems necessary to reiterate one important fact which is sometimes overlooked, viz., that completely paralyzed muscles from infantile paralysis always remain so. Partially affected muscles, however, can be developed greatly by scientific active motion personally supervised by one who is thoroughly familiar with the conditions. When the parents are advised to "simply let the child run for a while and develop the paralyzed muscles," it means that those completely paralyzed are not benefited, and those partially affected may be overtaxed, thereby losing much strength which could have been retained and developed.

Nerve grafting has hitherto not proven satisfactory, although in the future much may be accomplished in this direction.

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## THE TREATMENT OF PUERPERAL SEPSIS.\*

"AN OUNCE OF PREVENTION IS BETTER THAN A POUND OF CURE."

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*Puerperal infection* is the general term applied to all infective conditions which arise from the entrance of organisms into wounds of the generative tract in connection with labor or the puerperium. It is essentially wound infection and is strictly comparable to "surgical wound fever."

I am not going to discuss all the methods of treatment nor the treatment of all the types of puerperal sepsis. I shall exclude from consideration such conditions as pus tubes, appendicitis, erysipelas, diphtheria, scarlet fever, gonorrhea, and those cases in which there has been a pre-existing focus of infection, which frequently complicate pregnancy. I shall consider only that condition arising from wound infection. I refer especially to the puerperal sepsis seen in the regular grind of general practice, and appearing after what has seemed to have been an ordinary normal labor—that which, by the laity, is called "child-bed fever." There are many good methods of treatment, but that which will be detailed by me, is the one which has been most effectual in my practice. I assure you that it is not all original, but has been gleaned from the experiences of the leading obstetricians of the various American and European clinics.

For the sake of study, the treatment of puerperal sepsis may be divided into: 1, prophylactic, and 2, curative.

*The Prophylactic Method.* In the first place we should have the parturient patient located in as hygienic and salubrious a place as possible for the confinement. It is self-evident that we cannot expect to conduct an aseptic surgical operation amid septic surroundings.

The best place for such a responsible undertaking is in a well equipped hospital with trained nurses and plenty of help, but the hard working country doctor has no such advantage at hand and must make the best of such conveniences as he can command. The city doctor has every advantage and is therefore doubly culpable if he fails to avail himself of these helps to aseptic midwifery.

The patient should be confined in a well-ventilated room. There should be plenty of fresh air. Fresh air does not mean cold air. There may be a

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brisk fire burning in the room, and even though the windows be open, the air will be warm. No home is too poor to be clean and no window too small to admit fresh air, if it be opened. I have often been called in council and found the patient still dressed in reeking underwear and at times a skirt in addition.

The vulva should be cleaned with soap and water and may be painted with tincture of iodine. It is a good procedure to shave the vulva. If a bath is given, the nurse must be careful not to allow the dirty water to run over the vulva into the vagina. Zweifel reports several cases of infection from this source.

The patient should be covered with a sterile, or at least clean, sheet; and not with a soiled blanket or comfort.

Sterile supplies, such as dressings, towels, gloves, sheets, catheters, tape, etc., are not difficult to obtain. In the city they can be obtained at a nominal cost from any good hospital; in the country every up-to-date physician has a sterilizer in his office and can sterilize his supplies with little effort. To go to a labor case without such preparation in view of the cost and ease of obtaining the same, is little short of criminal. And then the people appreciate it and are willing to pay for it. Some men will say that they do not do this and that they never had a case of puerperal sepsis. They are liars. Others will say that they never had a death from puerperal sepsis. There are some things that are worse than death. How about the morbidity? How about the one child marriages, the pus tubes, the pelvic inflammations and adhesions? How about the years of weary suffering and disappointment? Between morbidity and mortality there is little to choose in these cases.

We cannot have graduated trained nurses in all cases, but we certainly can teach the slovenly "experienced nurse" to wash her hands and be clean. Of course, we must cast the mote from our own eyes before we can ask her to remove the beam from hers. These nurses may object to this instruction, but if we explain to them how much *they* gain by it, they will appreciate our efforts. And how easy it is to teach the good sister or mother or friend of the patient to do all these things in a cleanly manner. But you must show them that *you* know what you are talking about or they will not appreciate the value of the efforts demanded.

In lecturing to the nurses at the Grant Hospital I have always impressed upon them that the most important article of an obstetrician's armamentarium is a good brush and a bar of soap. The brush

need not be fancy and the soap need not be patented or perfumed. A common rice straw brush and a bar of common soap will suffice. *The main prerequisite for the prevention of puerperal sepsis is clean hands.*

You should wear rubber gloves when handling the parturient woman. It is just as important at this time as it is in the operating room. It is malpractice, in these days of refinement, to attend labor without rubber gloves. Some will laugh at this statement and say they cannot feel anything with gloves. They must learn to feel with gloves. Perhaps you can conduct an aseptic labor without gloves, but why not use every aid to attain that object? Why refuse any single aid or modern refinement where so much is at stake? We know that God is patient and good, but why should you try His patience and risk your reputation and the life of a good woman who has placed her trust in you? The young fellow just from college will use them and the people will notice it. It is important that the hands be clean before applying the gloves and it is important that the gloves be kept clean after they are on the hands. It is ridiculous to see a doctor putting clean gloves upon dirty hands. Suppose the glove tears. It is just as foolish to immerse a dirty glove into a solution of bichloride of mercury and imagine it is sterile. A soiled glove must be cleansed with the same care as a soiled hand. And the same applies to the catheter. You do yourself an injustice when you use any old rag for a perineal pad to absorb the lochial discharge. A most useful bed covering for labor is the paper sheet sold by all dealers of physicians' supplies.

The use of sera to immunize against infection does no good. We must follow the principles of Crede and limit as far as possible the puerperal wounds and prevent the infection of necessary puerperal wounds. Every puerpera is a wounded woman. If it is good surgery to limit the operative wound and to avoid the injuring of the tissues, it is also good obstetrics. We must limit the number of internal examinations and make them gently and in a cleanly manner. It is important that all obstetricians learn to make diagnosis by external examination. About the only points indeterminable by external examination are the state of the cervix and the possible prolapse of the cord. The bag of waters should not be ruptured until the os is completely dilated, because the membranes dilate the cervix with the least trauma and also mechanically prevent the entrance of germs into the uterus. You must avoid all measures to shorten the time of



normal labor, as manual dilatation of the cervix, of the perineum, or having the woman bear down before the head is through the cervix. Do not give ergot until the placenta is delivered. Do not apply forceps until there is an honest scientific indication for their use. Pituitrin, scientifically used, is replacing forceps, and in Vienna they think that the use of this agent instead of forceps is reducing the morbidity and mortality of their clinics. Do not use douches, especially hot ones or antiseptic ones, in normal labor. They rob the vagina and the cervix of their epithelium and natural secretions. Prevent perineal and vaginal tears as far as possible, which means a patient conduct of the second stage; but do not allow the other extreme, or practice, and permit the head to pound for hours upon a rigid perineum until the vitality of the tissues is lost and they are bruised and infiltrated with blood. Early episiotomy and forceps are more scientific procedures.

The third stage should be conducted as physiologically as possible. Interference should be instituted only upon strict indication. Above all, do not attempt manual removal of the placenta unless there is profuse hemorrhage or it is pathologically adherent. Be very careful to obtain the placenta and membranes complete. Retained placenta makes splendid soil for the cultivation and growth of the vaginal bacteria and also prevent involution, which is itself a barrier to infection. The uterus should not be bruised by too early or too vigorous attempts at Crede expression of the placenta, or too much or too forcible massage of the uterus. In Vienna they never express the placenta unless there is bleeding; they leave it alone and allow it to come of its own accord. They say that this has helped to reduce the morbidity in that clinic. The placenta and membranes should be inspected to see that none is left in the uterus. It is the keystone of the treatment of the patient should fever arise subsequently. If a piece is missing it should be removed at the time of labor. If it is a large piece, it is not necessary to go in for it. You must see that the uterus is free from blood clots, hard and firmly contracted, before you leave the house. I find that allowing the woman to get out of bed to the commode the next day after delivery allows blood clots to drop from the vagina and also acts as a drain, thereby preventing, to some extent, infection.

Prevention of infection of the unavoidable wounds comprises the principles and practice of asepsis and antisepsis and should consist of a technique most rigid in character and should be part of the very body and soul of the accoucheur.

I have not gone into the preparation and care of the patients before labor begins. I am taking it for granted that the cases with which we are to deal were perfectly normal when labor commenced.

If you have carried out the above program you should not have an infected case. If you do have the misfortune to have your patient infected, you must resort to the curative method.

*The Curative Method* is divided into: 1, local; 2, general; 3, specific; 4, surgical.

We are seldom able, at least in our own minds, to designate the original or specific focus from which the infection emanates. We must investigate the history of the labor, paying especial attention to the frequency of examination by vagina, the use of instruments or manipulation, the character of the third stage and the existence of lacerations. The temperature and the pulse must be studied. Very careful examination of the breasts, abdomen, and pelvis must be made and the relation of the condition of the alimentary tract to the general condition ascertained.

The treatment of puerperal sepsis has undergone many changes in recent years. The polyglot treatment of former years has given way to a more physiologic treatment; and we now rely more on aiding and stimulating nature's own methods of combating the disease. Nature has always been the best doctor for most diseases. When the general medical examination has excluded all other causes for illness and a diagnosis of puerperal sepsis has been made, the woman is isolated in the lightest, airiest room available, and put at complete mental rest, which means that a clean, pleasant, sensible obstetrical nurse is put in charge of her. A brisk cathartic is administered (calomel followed by salts or castor oil) and the patient put upon a generous semi-solid or fluid diet. If there be stitches in the cervix or perineum, they are removed at once to allow free drainage. The gaping wounds and the vagina are swabbed with pure tincture of iodine. Developments are then awaited. It seems to be a general custom to give quinine at this stage of the disease, but I do not know why. I never saw it do one bit of good and I do not see why it should.

Many teachers, including DeLee and Ries and others, are strongly opposed to manipulating the uterus even if they are sure that there is something remaining in it. McPherson and others are just as strongly in favor of emptying the uterus if there is anything in it. I agree with both of them. We must approach this matter in the manner of the student who was told by his teacher how to mix paints. We must do it with our brains. We must

pay special attention to these matters and learn by experience and then we will have the requisite brains to form our judgment. DeLee and Merman report large numbers of cases treated by what they call a nihilistic or expectant treatment with wonderful results. I have seen many cases where severe illness was caused by active local treatment and in some cases death was caused by curettage, pelvic drainage, etc., intended for relief. The patient may be propped up in Fowler's position to aid drainage, but curettage, brushing out the uterus, packing, etc., are seldom employed by us at Grant Hospital. About the only indications for such treatment is hemorrhage from the uterus. If the woman does not show immediate improvement then we go further with our treatment.

*The local treatment* of infection is the attempt to remove the offending bacteria and their toxins, and their pabulum, clots, membranes, placental fragments, decidua—and to destroy those bacteria and neutralize those toxins which remain in the vaginal canal after the mechanical cleansing.

The idea is an excellent one, but this is a very dangerous procedure, even in the hands of an experienced obstetrician or surgeon. Under this head I wish to most strenuously decry the use of intra-uterine douches. They are most ineffectual because the bacteria are beyond reach fifteen minutes after they are inoculated. They are painful, sometimes violent uterine contractions being set up, and the fluid may escape through the tubes into the peritoneal cavity and a fatal peritonitis may occur. That the fluid can be forced through the tubes was amply proven some years ago in the service of Dr. J. F. Baldwin at the Grant Hospital. Some of you will say that they can be given carefully; that the douche bag should not be held too high; that you have often used these douches and have seen no harm. Who can tell the exact resistance of the tubes and the uterine walls in each and every case? Who can be sure that you or the nurse will hold the douche bag at the exact and proper height each time? If the greatest surgeons in the world are never sure of the consistency and resistance of the uterine wall, why should you tempt fate with such a dangerous procedure? You say you never had an accident; if you mean a death I may agree with you; but how about the morbid condition produced by your douches?

The nervous shock from these douches may cause syncope, convulsions, and even coma. The antiseptic may be directly poisonous, over fifty cases of bichloride and many cases of carbolic poisoning being on record. Air embolism, perforation of the

uterus, profuse hemorrhage, chills and fever from inoculation, sudden death from cardiac paralysis may result. The infection may be carried higher to uninfected parts. This protest against the intra-uterine douche must not be construed as inveighing against vaginal douches, as I believe in them *when specifically indicated*. Swabbing out the uterus with gauze wound around forceps and saturated with chemicals, or brushing the uterus, is deprecated by me.

Curettage or digital examination and removal of the uterine contents is recommended by many authorities here and abroad, among whom may be mentioned Williams, Hirst, Gallabin, Jellett, Sinclair, Chrobak, Schauta, Ahlfeld, Bar Pinard and Pestalozza. I use this method at times when I think it is indicated. You must be careful or you will do more harm than good.

Curettage was introduced in 1850 by Recamier, who invented the curet for this purpose. Some operators use a sharp and others a blunt curet. Some use it as a routine practice as soon as the fever disappears; others use it only if the finger fails to remove the particles from the uterus. Some repeat the operation once or oftener and some pack the uterus at the end of the operation. The principle exponent of this operation is McPherson of New York. Opposed to him are Williams, DeLee, Noble, Craigin, Edgar, Watkins, Ries, Bumm, Leopold, Fehling, Kronig, Veit, Ohlshausen, and others who formerly advised the operation.

I think that the curet is a very dangerous weapon at all times and especially at the puerperium. As I said before, it is an instrument that must be used with brains. I rarely curet in these cases of infection, but when I do, I assure you that I feel the great responsibility and danger of this operation more than when I operate upon a patient for any other condition. I do not believe, as do some of my more noted colleagues, that curettage is an operation to be performed by the general practitioner, especially in cases of puerperal sepsis. The delicate bank of leukocytes, the wall that nature throws up to limit the spread of the bacteria, is broken through, and the bacteria are literally ground into the lymph spaces and venous lumina. It is a thorough vaccination of the uterine tissues and resembles raking the soil after strewing it with seed. No matter how expertly done, curettage cannot remove all the diseased tissue. Perforation of the uterus is a common occurrence and causes fatal peritonitis. I have several times seen loops of bowel dragged down into the vagina. Hemorrhage may occur and cases of air embolism have been

reported. A pyosalpinx or other pus sac may be opened by this manipulation. It makes no difference how carefully the operation is performed, there is always danger of perforation. DeLee says that it is about as reasonable to curet the nose and throat in cases of diphtheria as to curet a uterus for puerperal sepsis.

Emptying the uterus with polypus forceps is also a dangerous operation on account of the danger of perforation and also mutilation of the uterine wall. I use this instrument a very great deal, but I fully appreciate the great delicacy of touch and care necessary to avoid accidents.

Drainage of the uterus with glass or rubber tubes is advised by some French, Italian, and American obstetricians, but I do not think much of this procedure. In my opinion, packing the uterus with gauze stops drainage and presents the same dangers noted above for the other procedures. Nature often does wonders. Winter, Saft, Merman, Bumm, Watkins, DeLee, Ries and Cr  d   strongly emphasize the dangers of local treatment and one voice after another is being raised against intrauterine douches, curettage, and other local interferences with the process of healing adopted by nature. I hope that I have impressed you with the danger of the use of the curet in these cases and that you will be slow to resort to its use in the future. It is a good instrument in skilled hands when indicated.

*General treatment* includes everything that will improve the woman's general health and help her to throw off the disease, and the attending physician should count no effort lost that will increase her resisting powers. If mental and physical rest do not procure sleep, morphine should be given. Sleep is a prime necessity. Visitors must be excluded from the room and everyone about the house should bear a cheerful mien. Nursing of the child should be stopped because it worries the mother and the child may become infected.

For the *fever*, as a rule, nothing need be done. Antipyretics are especially contraindicated and the heart should not be tired by too much moving of the patient. As in Vienna, aspirin may be given to reduce the temperature by combating the poison and eliminating the toxins. Aspirin is a splendid diaphoretic. I have had a patient get well after carrying a temperature of 105   for three weeks. Another recovered after having a temperature of 103   to 105   for five weeks. In these cases nothing was done for the temperature. Drugging is to be avoided, as far as possible, because it does little good and because it upsets the stomach, the most important ally of defense. Alcohol is not used as

much as formerly, and I am sure that it never did as much good as was supposed. I seldom use it at all. If alcohol is used, one-half ounce a day in the form of eggnog or wine is sufficient.

The *bowels* should be kept open with an occasional laxative. Diarrhea is one of nature's best drains and should not be interfered with unless the patient is exhausted. Opium and starch enemata are good to relieve the diarrhea. Vomiting is always a bad symptom, and if bilious always means a fatal ending of the disease. Food by the mouth is withheld for a while and rectal feeding instituted. Saline drop enemata will serve to quench the thirst. Or if vomiting persists the stomach may be washed out. I have had excellent results with this method. It is surprising how much greenish-black fluid is removed and the patient feels relieved for several hours. Drop doses of wine of ipecac has been tried by me with good results. Later, against peritonitic vomiting we stand powerless and dismayed. Many surgical methods of feeding have been tried, but the women always die, not from starvation but from toxemia.

Meteorism or gas pains in peritonitis is a troublesome condition. Overfeeding and cathartics are to be avoided and enemas given. We are in the habit of giving the old fashioned S. G. T. enema, composed of salts, glycerine and turpentine for this condition. DeLee recommends an enema composed of one pint each of milk and molasses.

For *chills* the patient is covered warmly and given warm drinks. If the chill is prolonged, one-sixth of a grain of morphine may be given hypodermatically.

Attention is given the heart and exertion of the patient is avoided in order to save the strength. Cardiac stimulants are to be avoided until they are absolutely needed. Many patients have been "strychniaized" to death. Fresh air and oxygen are recommended as the best aid for syncope. I can testify to the efficiency of fresh air, but I am forced to admit that I have never seen oxygen do one bit of good in these cases. We always use it because the laity expect us to do so, but I am sure that it is a waste of time and money.

Special attention must be paid to the diet and little fats given. Milk, especially buttermilk, may be given. Kumiss, eggs, jellies, cereals, sugar, ice cream, and gelatin in all forms are permissible.

The mental state of the patient must be treated. She must be buoyed up with the hope and assurance that she will recover. You will be surprised how much can be accomplished by this.

*Specific Treatment.* Most of the remedies used

in the past for the specific treatment of puerperal sepsis have failed. Under this head may be listed the silver preparations of Cr  d  , the mercury inunctions, and injection, the use of iodine, quinine and alcohol given intravenously and subcutaneously. Salt solution is a remedy that has been much lauded in the past for the treatment of all forms of infection. It is valuable but is far from being a panacea. The best method of administration is the drop method of Murphy. Care must be used in the intravenous use of salt solution; there is not only danger of air embolism but there is danger of overloading the circulation, causing pulmonary edema. It does not wash the toxins from the blood, as they are so bound onto the cells that only biochemical action can loosen them. The good effects of salt solution, when carefully and skilfully given are, that it stimulates the heart and kidneys, skin and intestines, relieving thirst and fatigue and promoting leukocytosis. Schauta of Vienna reports some success with the use of nuclein, but the results are not yet such as to justify its general use.

I have seen a number of cases treated with serum without any effect either for better or for worse. We might just as well have injected water and saved a whole lot of money. DeLee, in his large experience, has used all kinds of sera for 16 years, and says that he is positive that anti-streptococci serum does not cure a single case of streptococcic sepsis. Williams, Pryor, and Fry confirm these findings. Large numbers of cases have been treated by Bumm, Chrobak, Gordon and others and the reports are far from encouraging. In Vienna the use of sera has been abandoned and also in Munich. Our experience at the Grant Hospital has taught us that their use is absolutely futile. Tetanus serum has been found useful when indicated but the anti-streptococcic serum is useless. The reason for this is obvious to those who are working along the lines of immunity and hence I will not take the time to discuss it here.

DeLee, Williams, Cragin and Newell have found the results of vaccine therapy in puerperal infections to be negative. I do not feel that there is at present much to be gained by the use of vaccines in this condition. I think that we had one case in our hospital where vaccines were used with apparent good result. But our experience is too limited to speak with any degree of authority. Dr. Shilling is constantly working on this subject in our laboratories, and may report something of interest later. It is generally admitted that in acute puerperal sepsis vaccine therapy is useless and may be harmful. The abscess of fixation, once in a while heard of, has been lost in the march of progress.

*Surgical Treatment.* Little need be said about the surgical treatment of puerperal sepsis other than has already been discussed in the preceding chapters of this paper. The treatment of pelvic inflammations by operation in this condition is no different than in any other. No real difference of opinion exists regarding the procedures advocated for the treatment of localized suppurations. Two radical operations have been employed in the treatment of severe infections and there is much to learn about both of these. One is extirpation of the uterus and the other is ligation of the pelvic veins, with the view of stopping the progress of a thrombophlebitis. Total hysterectomy has been done several hundred times, but without enough success to give it a firm place in our therapy. Most of the authorities whom I have consulted admit the following indications for hysterectomy. In all of these the local lesion is the predominate factor. They are rupture of the uterus or vagina with infection, perforation of the uterus with peritonitis, or perforation of the uterus during local treatment of an infection within it; the infection of a fibroid, or when a fibroid has been much bruised by an operative delivery and infection is feared; cancer of the uterus (I saw one such case in a woman who was six months pregnant); infection with molar pregnancy; abnormal adherence of the placenta with infection; uterine abscess; gangrene of the uterus.

The greatest danger is from peritonitis due to soiling the peritoneum during removal of the uterus. Much uncertainty exists as to the propriety of removing the uterus in cases of bacteremia, or at least in cases of severe endometritis and uterine lymphangitis, when the infection, presumably, is still more or less limited to the uterus. Experience has shown, says DeLee, that uteri are usually removed too late, to do any good, and in those cases where the courageous operator has removed the uterus early, he could never be sure that the operation was necessary. The operation may have killed her, or, if she got well, may not have contributed to her recovery, and has rendered her sterile. I have seen cases where I felt that the operation really saved a life. Williams, Lea and Edgar contend that no one would expect any good to result where a general bacteremia exists and I agree with their views. Septic patients are the very poorest subjects for operation and anesthetics and great care should be exercised in the selection of subjects for this operation.

The operation for ligating the pelvic veins is still in its infancy. It is a formidable operation and the results are so far from satisfactory that even the

European clinics are approaching it with little enthusiasm.

In recapitulation, I will give you what I consider a good treatment for the relief of puerperal sepsis, of the type noted in the beginning of the paper.

1. Absolute rest in bed, in a good hospital, if possible, and with an intelligent nurse who is not afraid of work and who likes to look pleasant and cheerful all the time.

2. Plenty of warm fresh air and sun light.

3. Patient in Fowler position.

4. Remove all stitches and swab wound with pure tincture of iodine.

5. Good nutritious semi-solid or fluid diet. Feed at least every four hours. Plenty of good cold water to drink.

6. Take babe from the breast. The breasts may be kept in condition for nursing later by massage and pumping.

7. Tepid sponge baths every three or four hours, when the temperature is 102° or above, unless the patient objects. They seldom object.

8. A brisk cathartic at the beginning of the treatment. Then an occasional laxative to keep the bowels in good condition.

9. S. G. T. enemas for the relief of gas pains.

10. Seeping enema. I usually give it for one and a half hours and then discontinue for three hours and then repeat.

11. Cherry red iodine vaginal douches every four or six hours. These douches are given for sole purpose of flushing out the vagina and to keep it free from debris, and not for any specific therapeutic purpose.

12. Aspirin, twenty grains every four hours. I give it at night if the patient is awake.

13. If the heart is arrhythmic and beats more than one hundred and twenty times per minute and is of poor quality, I give fifteen minims of digalen every three or four hours. It is given hypodermatically.

14. No visitors admitted except the family whom I request to have a cheerful expression when they call. The patient is assured that she will recover and she generally does under this treatment.

Surgery, sera and specifics are of little or no avail. There are other methods of treatment but the above outlined treatment has given me brilliant results and most of the cases treated by me have returned to normal in seven to ten days without any complications or sequellae so far noted by the patients or their attending physicians. When possible, I have a blood count made daily and the increase of

the leukocytes and the decline of the polynuclears is most interesting and gratifying.

In conclusion, I wish to say that the sum and substance of this whole matter is that the general practitioner is the man to prevent and also treat puerperal sepsis. It may be prevented by keeping the patient in good health and amid hygienic surroundings before labor, and by conducting the accouchment in an aseptic manner in a clean place. If you are unfortunate enough to have a patient infected, she is to be treated with cleanliness, fresh air, good nursing and brains.

If you tell me that the above cannot be carried out in rural communities, I will say to you that there are no rural communities *so far as the practice of obstetrics is concerned today*. Some of my cases were treated in country houses, nursed by intelligent housewives. I demonstrated to them just what I desired and assured them that they were capable of carrying out my scheme of treatment, and the enthusiasm with which these good women applied themselves to their duty was most pleasing and satisfactory to the attending physician and myself. Please note that the young doctor, just arrived from college and hospital internship, will know how to practice aseptic obstetrics and how to treat sepsis in the most modern and approved manner. The women will soon learn of his ability and this matter will soon become of business interest to you.

It is not expected that this paper will interest those dreamers and therapeutic nihilists who are satisfied to practice obstetrics as was the custom when the new testament was in the process of formation. It is primarily intended for the progressive element of our profession whose ambition is to render the best service possible, even though it involves considerable trouble to save the life or health of the puerperal woman.

238 E. STATE STREET.

Authorities consulted: Lea, DeLee, Davis Herman, Hirst, Schauta, Leopold, Wirthheim, Baldwin, Bonney, Leopold, Bumm and others from whose works much of this thesis has been abstracted.

#### PASSIVE MOVEMENTS IN ELBOW INJURIES.

Failure to recognize the pernicious effects of early passive movements in elbow injuries leads to continued inflammation of the joint and protracted stiffness from increased adhesions and callus formation, and may result in a severe degree of permanent disability later. Passive exercises may be usefully employed when the range of movement is increasing.—EDWARD W. H. SHENTON in *The Lancet*.

## CYSTOSCOPY IN THE FEMALE.

MAX GOLDMAN, M.D.,  
KANSAS CITY, Mo.

It is now twenty years since Howard A. Kelly published the description of a method of urethral, bladder, and ureteral exploration according to definite principles, and with certainty and comparative ease. For many decades before investigation along the line of bladder research of the boldest and most heroic kind had been carried on by zealous workers, but in the light of our present knowledge, the names of Howard A. Kelly and Max Nitze stand out above all the rest. As the electric instrument of Nitze enabled us to view with precision the hitherto unexplored bladder cavity in the living, so did the instruments of Kelly, coupled with the posture and reflected light, open this field to us for study and investigation in the female, limitless in scope and most promising in results, particularly so far as diagnosis and treatment were concerned.

Strange as it may seem to those unfamiliar with the actual technic of this method, it is, after all, easy of execution, the only requirements being the few instruments of simple construction, the distension of the bladder with air by the particular posture called by Kelly the "knee-breast position," and careful attention to asepsis and avoidance of trauma to mucus lining of organs concerned in the examination. The details of the cystoscopic technic of Kelly are known to everyone; but the appreciation of the ease and at the same time the value of the procedure have unfortunately reached comparatively few men in the surgical and urological profession. The urologist is concerned apparently with the more difficult and more serious affections of the male urinary organs, and is content with the application of his technic to the investigations in the female. Now does not this seem more than strange, inasmuch as the ordinary cystoscopy applied to the female fails in several most important features, among which are, first, the direct observation of every part and lesion of the bladder, urethra, ureteral meatuses, and interior of the bladder; and, second, the ease with which topical treatments can be applied, the ureters catheterized, foreign bodies removed, and most minute descriptions of pathological states recorded?

As to the best means of exploring the bladder in women, it can be said that there are but two methods of choice: first, the cystoscopy of Nitze, or its modifications, with water as a medium for distension; second, the reflected light with Kelly's cystoscope, with air as a medium. The former is much easier to perform; the difficulties encountered in the

procedure in the male are not met with; one can use a long or short instrument, and the patient, as a rule, resists less; but in the thorough examination of the interior many difficulties are encountered. It will suffice to briefly review a few of these difficulties:

(A) The painful bladder in women will not yield to water distension as kindly as the male bladder, and the patient becomes extremely restless and nervous, thus requiring a general anesthetic, or, she is unable to retain the fluid, with the disturbing consequences incidental to bladder contraction, and variation in quantity of fluid retained.

(B) The landmarks in the female bladder when it is distended with fluid are so few that if there exists either a distortion because of pelvic tumors, swellings, deflections from adhesions, or displacements, one will easily become confused unless he is fortunate enough to have an uncomplainingly submissive patient, which is the exception rather than the rule.

(C) The urine cloudy from pus or blood, as, in the case of cystoscopy in the male, often so blurs the visual field that the examination has to be abandoned to be repeated later.

(D) As inflammation and ulceration may be presented in large or small patches, thus giving the bladder an angry red, beefy appearance, it is very apparent with what difficulty one would come to any definite conclusion as to pathology, or with what limited success one would find the ureteral orifices, should such a pathology exist in their vicinity.

(E) To view the entire cavity of the female bladder with the water medium with such care and precision as to inspect every portion with the lens close enough to the part to thoroughly identify it, even in a bladder not markedly pathologic, and to detect even minute lesions, such as fissures or ulcers, is impossible to anyone except a master of marvelously skillful technic, if for no reasons other than the mechanical difficulties in the way, or, because of the necessary pain and discomfort arising from the manipulations.

(F) Presuming that many of these difficulties can be overcome in any one given case with the Nitze cystoscope—though of course in a series of cases they must be presented as obstacles here and there—presuming that one has succeeded in inspecting the interior of the bladder, in making a diagnosis of, say, ulcer or foreign body, one can readily see the difficulties presented either in the way of topical treatments or in the easy and rapid removal of a foreign body.

None of these difficulties present themselves in the Kelly or air method of bladder examination.

(A) The entire interior of the bladder can be viewed in less time than it takes to describe the technic, and as Kelly has said, a few seconds are often sufficient.

(B) The landmarks, when the bladder is distended with air and the patient is in the knee-breast position, are plain and well defined. In the first examination she may need a little reassurance to become confident of freedom from pain or great discomfort, and she will usually be of the greatest assistance by changing positions, straining when requested, or answering inquiries in regard to location or character of pain.

(C) Should blood or pus escape from the ureteral meatus, it is at once apparent and can be easily collected, as can a culture or smear be made most readily from a swab direct from the area involved.

(D) Whatever pathology presents itself in the bladder mucosa, the eye is directly upon it, and its character, location, blood supply, the sensitiveness of the mucosa, contraction of bladder walls, or other phenomena, can be unmistakably observed and recorded.

Given a patient whose complaint, among other symptoms, is frequency of urination of varying degree with more or less pain at the time of or following the act of micturition, particularly if the pain be referred to or localized in the bladder, and especially if there be pus or blood or bacteria in the urine, which it is presumed has been carefully examined microscopically and chemically, one is justified in deciding to perform a cystoscopy along with the rest of the procedures of a thoroughly complete gynecological examination. The justification is more than emphasized by the discovery of some unlooked-for urological lesion somewhere along the tract; either latent or concealed, and of which the bladder symptoms or condition are but a part. If, in addition to symptoms, there is a history of previous uterine, tubal, urethral, or other infections, even a history of such diseases as typhoid fever or perirectal abscess, or suspected colon bacillus or gonorrheal infection, then the indications for a careful cystoscopic examination should not be overlooked. It is always necessary to make a most searching pelvic examination since the diseases of the pelvic organs very frequently are the primary causes of symptoms referable to the bladder. Conversely, in every instance where one feels justified in recommending a major gynecological operation and urinary symptoms are present, a cystoscopy should be a routine procedure prior to

operation, and it would be of inestimable benefit to many patients if it could be done prior to many minor operations. It is a good rule to make a cystoscopic examination after each major pelvic or abdominal operation, upon the appearance of any bladder symptoms, and more especially in those cases that require catheterization before or after operation.

In the first exploration of a case for the purpose of diagnosis, especially one in which a foreign body is suspected, or where it is expected to have to catheterize the ureters, the electric cystoscope might be chosen because of the ease and certainty with which the search can be carried on, unless such interferences as the following present themselves, namely:

(a) Inability of the sphincter vesicae to retain the water injected into the bladder ;(b) pus or blood escaping from the ureteral orifices or a fistula, blurring the vision by clouding the water medium; (c) or resistance of the bladder wall to the fluid, preventing the proper distension of the bladder.

Upon making the diagnosis of a definite lesion, or discovering or locating a foreign body small enough to be removed through the urethra, it is advisable, unless the electric instrument is strongly indicated, to dispense with it and follow up the case for the purposes of inspection and treatment with the simpler and more satisfactory method of Kelly. It should not be overlooked that there are some cases, I should say five per cent., which, owing to hypersensitiveness and extreme strangury, will require a general anesthetic, and in these cases the cystoscopy could be made either with the electric cystoscope, or with the Kelly method, or with both.

To illustrate the great value of this diagnostic procedure, in the routine examination of women, the following cases are taken from a series during the last twelve months; the chief point demonstrated by their report is the ease and importance of a cystoscopic examination, more especially the more direct method of Kelly.

CASE 1:—Mrs. G., age 30, had for a number of years a right movable kidney with occasional attacks of temporary hydronephrosis. She presented a history of frequent urination, but pain was not a marked symptom. Urine analysis absolutely negative. She had a retroversion of the uterus, the broad ligaments were abnormally tender on pressure, and the vaginal outlet was relaxed because of a perineal laceration. Prior to operation early in 1914 cystoscopy and ureteral catheterization performed by the Kelly method. Urine normal; bladder and trigone free of hyperemia or inflammation, but urethra very intensely congested, displaying a



fiery redness. A few topical applications to the urethra subsequent to her recovery from operation sufficed to give entire relief.

CASE II:—Mrs. G., age 19; married fourteen months. No history of pregnancy. On March 30, 1914, began to complain of an irritability of the bladder. Urine passed frequently and freely with some burning at the end of the act of micturition. A careful gynecological examination revealed the pelvic organs apparently normal, rectum normal, and no pathological findings on the exterior genito-urinary organs. The urine analysis was absolutely negative; no excessive acidity, pus or leucocytes being found. Cystoscopy: Bladder mucosa normal; ureteral orifices easily found and normal, but the trigone was intensely hyperemic and quite painful to the touch. The urethra was redder than normal, but not pathologic. A few topical applications of weak silver solution through the Kelly cystoscope brought on a disappearance of the symptoms.

CASE III:—Mrs. E. T., age 24. This case will serve to illustrate ulcerative cystitis as well as foreign body removal. The patient was operated upon in 1905 for acute appendicitis; after her recovery she began to pass blood from the bladder, and complained of considerable pain on urinating. She has always been very much of a neurotic, and the history of her case is rather thrilling, even before I first saw her in 1910. She had a nephropexy performed on her right side in 1905, two months following the operation for appendicitis; a gall-bladder drainage and stomach exploration in 1909; the wound failed to heal, so the abdominal scar was removed and the wound resutured in 1910, and in July, 1914, the climax in the way of operations was reached when a surgeon finally removed her tubes and ovaries through an abdominal incision. During her early visits to me in 1910, when she was being treated for a tubal infection of some sort, my attention was called to the condition of her urine, which was found to be bloody, purulent, offensive in odor, sometimes alkaline, sometimes acid, but always attended by severe pain in voiding. An occasional irrigation followed by the instillation of some weak silver solution, always gave her some relief, only to be followed by symptoms just as severe as before.

On December 3, 1910, I prevailed upon her to submit to a cystoscopy under an anesthetic. A bit of glass catheter 3 c. m. long was discovered in the bladder and removed with ease. (It might also be of interest to record here that on May 31, 1910, during a vaginal examination several pieces of glass from an irrigating tube were removed from the vaginal canal. No definite history of how they happened to be there could be obtained, but she had had several vaginal douches at one of our hospitals where the glass irrigating tube was used.)

The symptoms were not relieved, however, and she returned for another cystoscopy in September, 1913. This was done in the knee-breast position by the Kelly method. The ureters were catheterized with ease; the urine from each side was perfectly normal, the urethra dilated very readily and distension was extremely satisfactory. The bladder

showed a uniform redness of inflammation seen in a diffuse cystitis, but no ulceration except over the trigone and around the internal ureteral meatuses, where there was found a number of small ulcers, like cut out patches, very painful to the touch. The urethra was intensely inflamed. Near the posterior pole, about 2 c. m., below it on a vertical line, was seen a bit of glass tubing (a piece of catheter) with the free end rounded, the other end having penetrated the bladder wall for a distance of probably 3 m.m., and held firmly in place by its depth of penetration. In a few seconds this was removed with alligator forceps, and one can easily imagine the relief following.

The bladder recovered its tone and color, the ulcers nearly all disappeared, but there were still present in this case a few symptoms suggestive of the presence of some foreign body. Both the electric cystoscope and the Kelly method failed to demonstrate anything further, but on September 14, 1914, another cystoscopy by means of the electric instrument revealed the presence of another piece of glass catheter about 2 c.m. long at the base of the bladder on the trigone within the urethrovesical fold. She was placed in the extreme lithotomy position, the bladder was distended with air, and the glass was removed in two pieces, together with several others, by means of the alligator forceps and the Kelly cystoscope.

The ease with which the case has been treated topically and the exactness with which the patches of ulceration could be located, recorded and observed in their healing compels me to emphasize and recommend the air method of cystoscopy in cases similar to this one.

CASE IV. indicates simply the value of the procedure as a routine measure in diagnosis: Mrs. B. came to me after she had been under the care of two physicians, one of whom recommended an exploratory laparotomy and the other had not made a diagnosis, but had been prescribing for her. The history briefly was that she had been having, for the past few months, a pain in the right loin, more especially in front and along the right ureter; same pain in the right lumbar region, and but very little disturbance in urination; she had lost a little weight and occasionally had fever. No history of a renal colic was obtainable. The catheterized urine from the bladder was slightly cloudy, acid in reaction, and contained a few pus cells and a very slight trace of albumen. (Observe the acid pyuria.) Cystoscopy revealed absence of cystitis; the trigone slightly congested; ureters found with ease; right ureteral opening somewhat reddened; catheterization of the ureters by the Kelly method showed the left urine perfectly normal; the right contained much pus and dead epithelium; no bacteria could be demonstrated. While a diagnosis scientifically exact has not yet been made, the patient being very unreliable and irregular in her reports for examination, yet one can readily conclude as to the great value of the information thus far obtained.

CASE V. is simply to demonstrate the value of the

technic as applied to cases in which a major operation is planned: Mrs. L., in March, 1914, suffering from carcinoma of the cervix, underwent a radical Wertheim operation at Wesley Hospital. When the patient was brought to the operating room, it was decided to insert ureteral catheters to be used as guides in the dissection of the broad ligaments; she was placed in the Kelly position, and in less than five minutes I had both ureteral catheters in place and the anesthetic was then administered.

In conclusion, the points in this short paper which it is my desire to emphasize are:

(1) The electric cystoscope is an instrument indispensable to the general or gynecologic surgeon, and he should practice its use if he is to succeed in increasing his percentage of correct diagnosis.

(2) As a routine procedure in women, Kelly's is the method of choice and is superior to any other method known today.

(3) It is not a difficult procedure, and is one that can be mastered by nearly any one who has the patience, zeal, and desire to master it. As a diagnostic aid and as a means for treatment, it is of inestimable value, and should be more generally adopted as a procedure in the examination of women presenting bladder symptoms.

#### THE TEACHER OF SURGERY.

The teacher of surgery must be more than a mere operator. The progressive surgeon must be a man of good health, tireless energy, temperate habits and rigid honesty, with a courage based upon an accumulated knowledge which can be drawn upon in emergencies and difficulties. He must possess a power of decision based upon care and observation, in placing at their true value the results of the research of others, promptly seizing and applying discoveries of merit, but never going to the extent of dangerous radicalism. He must be able to make correct deductions from histories of patients to conclusively advise the indicated treatment and prognose the probable results. He must constantly aim to achieve distinction and fame, acknowledge the qualities of thoroughness and patience, be rapid and correct in thought and have in him the true fire of genius. He must be an accurate diagnostician and use careful judgment in deciding as to the advisability of operating and as to what particular method should be pursued; he must, moreover, be prepared to meet the many emergencies which inevitably arise during an operation and which demand prompt and decisive action, oftentimes modifying the opinion formed beforehand.—H. W. WIGHTMAN in the *Medical Record*.

## DIAPHRAGMATIC HERNIA, REPORT OF A CASE.\*

ROYALE H. FOWLER, M.D.,  
BROOKLYN, NEW YORK CITY.

J. W., age 53, native of Ireland, was admitted to Kings County Hospital, on the service of Dr. J. Bion Bogart, October 10, 1913, from the Long Island State Hospital. The patient was unable to give an account of his illness because of deafness and defective mentality. Communication with the hospital authorities revealed the facts that the patient had suddenly complained of pain in the abdomen four days previously, and was put to bed. He told the doctor in charge that his bowels had not moved in four days. He had vomited several times daily since the onset. Pain became more intense. Enemas and even croton oil had failed to produce a bowel movement. Vomiting was not fecal. The temperature did not rise above 100.5° A. M.

Physical examination: Well developed man, extremely deaf. Both eyes show interstitial keratitis. Impossible to see pupils. Teeth very poor.



Fig. 1.—Right side of chest has been removed.

Chest: Expansion fair and equal. Resonance good, front and back. Breath sounds bronchovesicular; a few coarse râles heard.

Heart sounds, poor quality, no murmurs. Blood pressure, systolic 130, diastolic 100.

Abdomen distended, not rigid, a little edema of the abdominal wall. Tympanitic all over. Pressure over the abdomen causes little pain. Liver and spleen not palpable.

Extremities negative.

Notes. October 10 (on admission). Abdomen distended. Patient very noisy, vomited light green sour-smelling material. 1 P. M., vomiting continues every ten or fifteen minutes. Complaints of severe pain after vomiting. Small amount of flatus expelled. 3 P. M., no results from compound enema. Severe thirst. 4 P. M., face flushed, body surface moist and warm. Total fluids for the day, tea, milk and water, 22 ounces.

\*By courtesy of Dr. J. Bion Bogart. From the Surgical Clinic at Kings County Hospital.

October 11. 8 A. M., slept at intervals during the night, somewhat restless; pulse regular, fair volume. Abdomen still distended. 11 A. M., takes nourishment well. 4 P. M., retains nourishment. 7 P. M., small amount of feces and flatus from enema, unable to retain enemas, three involuntary evacuations. Total fluids, 46 ounces retained without vomiting.

October 12. 10.15 A. M., three grains of calomel given. 1 P. M., vomited small amount of green



Fig. 2.

fluid. Total fluids, 40 ounces. 9 P. M., patient tossing about, noisy. 9.55 P. M., morphine.

October 13. 8 A. M., face pale, appears weak. 10.30, vomited three ounces of brown fluid without fecal odor. 11, small amount of flatus expelled with enema. Two involuntary evacuations during the night. 11.25, compound enema, return a small amount of fecal matter and flatus. Total fluids, 26 ounces. Notes by interne: Vomiting more frequent since admission and without effort. Calls out at

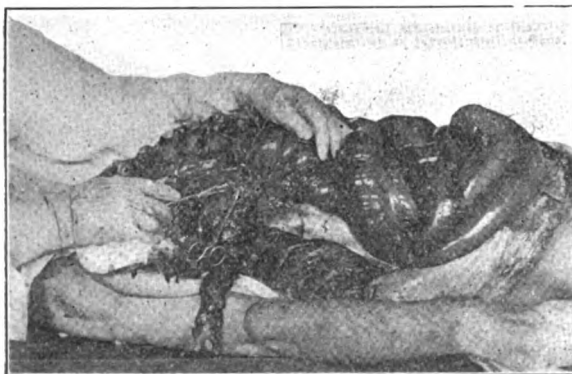


Fig. 3.—Right side of chest has been removed.

times as though in considerable pain. Abdomen more distended. No rigidity. Incontinence of urine. Rectal examination shows external hemorrhoids, but no obstruction felt low down. Prostate small.

October 14. 8 A. M., complains of severe headache and abdominal pain. Abdomen remains markedly distended. 10.30, vomited three ounces of brown fluid. 4 P. M., one ounce of castor oil. Total fluids, 37 ounces.

October 15. 8 A. M., face pale, lips dry, pulse irregular, rapid. Abdomen very tense, irrational. 9.30, vomited four ounces of curdled milk. 10,

vomited a large amount of thick brown fluid, fecal odor. 11, lavage ice only. High colonic irrigation resulted in return of small amount of feces and flatus. 12, patient appears weaker, noisy. 2 P. M., expired.

Urine, Oct. 10—Alkaline, 1018, no albumen or sugar.

Blood—19,720 leucocytes. 83% polynuclears; 13% large and small mononuclears; 1% transitionals.

Temperature record, October 10—100°, pulse 120, respirations 24. October 11—Pulse 84 to 100. October 12—Temperature 101°, pulse 100. Thereafter until death temperature slightly above 99°. Pulse between 90 and 100; just before death 110.

#### EXTRACTS FROM THE AUTOPSY RECORD.

On opening the abdomen subcutaneous fat is found to measure about 1.5 cm. in thickness. It is of a yellowish color. Great omentum not seen on opening abdominal cavity. The intestines are

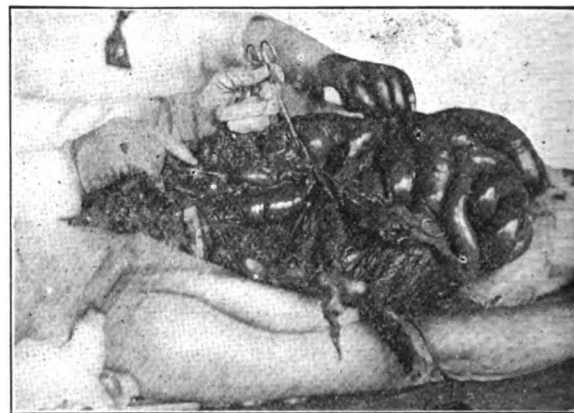


Fig. 4.—Sac opened.

greatly distended and covered with a plastic exudate. The blood vessels in the parietal peritoneum are distinctly injected. The parietal peritoneum on the right side, four fingers breadths below the umbilicus, shows a triangular patch of plastic exudate which measures  $2\frac{1}{2} \times 1$  cm. This patch corresponds to a similar one present in a loop of the small intestines. This was separated without much difficulty.

The large intestine was found to be tremendously dilated. It was traced upward to the diaphragm, where it seemed to be constricted. The intestines in the pelvic region were gangrenous and at several places perforations had occurred. Fecal matter was found in the pelvis and also near the spleen. Small and large intestines show post-mortem changes. Both are enormously dilated, the small throughout, the large to the middle of the transverse colon. In the cecum are small ulcers averaging a half-inch in width. They seem to be limited to the mucosa. There are multiple perforations in the sigmoid.

Rectum—Appeared normal, except for hemorrhoids at the anal opening.

Gall-bladder was tinged with green and contained no stones.



Liver—Weight 1637 grams, dark, slate-green in color due to post-mortem changes. On section this extended  $\frac{3}{4}$  cm. beneath the capsule. The rest of the cut surface was a reddish-brown. Parenchyma appeared normal except for areas of fatty degeneration. Lobules were not distinct. There was congestion.

Pancreas—Weight 156 grams. It was firm and appeared normal on section except for slight interstitial changes.

The diaphragm reached to the fifth rib on the right side, and to the sixth rib on the left side.

On opening the thoracic cavity a sac which contained the intestines was found.

A diaphragmatic hernia had been produced about 1 cm. below and to the right of the ensiform cartilage. On opening the hernial sac, which was lined

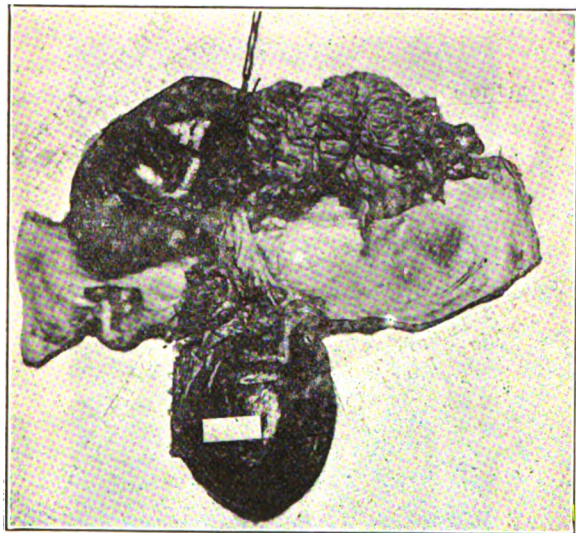


Fig. 5.—Showing the hernial contents removed and suspended above.

by peritoneum, it was found to contain the great omentum and about 20 cm. of the transverse colon. Omentum contained much fat and appeared normal. The intestinal loop was easily moved backward and forward through the hernial opening, but no attempt was made to pull all of the loop through. The under surface of the sternum was normal. The thymus was apparently replaced by fatty and connective tissue. The lung was bound by adhesions which were broken through with difficulty. The pleural cavity contained no fluid.

The lesions here reported and those not reproduced from the complete autopsy record, were:

(1) Right sided hernia of the transverse colon and omentum through the diaphragm at the site of Larrey's space. (2) Diffuse peritonitis of the lower abdomen, multiple perforations of the sigmoid; gangrene of the small intestines. Ulcers of the cecum. Plastic peritonitis in the upper abdomen. (3) Adhesive pleuritis, chronic pulmonary edema. (4) Myocarditis, chronic. (5) Parenchymatous nephritis, chronic. (6) Prostatic calculi. (7) Endocarditis, chronic, of the aortic valve. (8) Aortitis. (9) Bilateral corneal opacity. (10) External hemorrhoids.

For an elaborate consideration of this subject readers are referred to a contribution of Dr. Karl M. Vogel, which appeared in the *American Journal of Medical Sciences*, February, 1913.

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#### COLLAGOL INJECTION OF THE SEMINAL VESICLES FOR RADIOGRAPHY.

The vas is isolated at a convenient point near the top of the scrotum by a transverse incision one-quarter of an inch in length. One per cent. novocain gives good anesthesia, but must be injected not only into the skin, but also into the tissues immediately surrounding the vas. The latter is then elevated on a probe-pointed director, and along the groove of this, between it and the vas, a strand of silkworm gut is inserted. This is tied in a loop and serves as a convenient handle. The vas is now opened by a tiny longitudinal incision and a drop or two of novocain is injected into its lumen. This serves a double purpose, that of anesthetizing the vas for future manipulation, and of determining its patency. In a few of our cases the vas was found to be occluded at some point along its course, making injection of the vesicle impossible. The patient is then placed on the *x*-ray table, and a small soft catheter is inserted, with its eye lying just within the prostatic urethra. Injection of first one seminal vesicle and then the other is done, using a filtered 10 per cent. solution of collargol. The capacity of the seminal vesicle, or at least the point at which it overflows into the urethra (as determined by the flow of collargol from the catheter), has been found to vary. In some cases 2 c.c. sufficed, in others 4 or 5 c.c. When each vesicle has been thus distended the radiogram is taken. Our practice thus far has been to have the bladder empty, the patient flat upon his back, and the *x*-ray tube placed with its center over the symphysis. The excess of collargol is then withdrawn from the bladder and urethra (although no evidence has appeared of an irritating effect on these structures). The silkworm gut loops are removed and the vasa allowed to sink back into the scrotum. There has been no bleeding from the wound, and it has not been found necessary to close the opening by suture.—J. D. BARNEY in the *Boston Medical and Surgical Journal*.

Before employing a rubber catheter, test its resiliency. If it is brittle or cracked, discard it. Not infrequently a rotten catheter breaks off in the bladder while, of course, a rough catheter or sound may play havoc in the urethra.

# APPENDIX VERMIFORMIS OF LARGE SIZE. REPORT OF CASE.\*

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BROOKLYN, NEW YORK.

Any unusual pathological specimen, such as this appendix, is probably worthy of record.

J. E., male, cigarmaker, age 54 years, height 5 feet 7 inches, weight 220 pounds, came to me February 14, 1914. He had been in good health and had no reason to consult a physician since boyhood, except for fracture of the ribs three years ago.

The present trouble began about the middle of last November. Since then he had more or less pain in the lower right quadrant of the abdomen extending down into the groin. The pain was most intense just above Poupart's ligament and was worse at times. There had been no chill, but at times he felt cold. He had worked every day. His suffering had recently become worse and the pain for the last few days was intense. There had been no vomiting, but at times there was nausea.

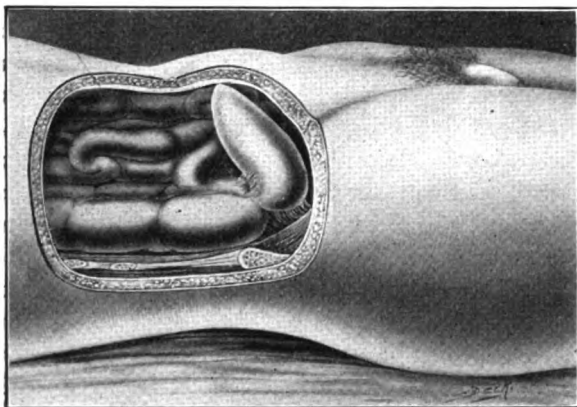


Fig. 1.

The man was stockily built, robust in appearance and of ruddy color. He had a corpulent abdomen. There was no distension or local swelling, but there was slight rigidity of the right rectus muscle. There was no tenderness except over a mass that could be plainly felt midway between the umbilicus and the brim of the pelvis, about the size of an orange and movable, but very tender. The abdomen was otherwise negative. Temperature 100°; pulse 100.

I operated upon the patient the following morning. Upon opening the peritoneum I found a pearly-white mass about the size of a pear, apex upward and slightly adherent to the anterior abdominal wall, wherefrom it was easily torn loose. It was movable except where it was attached to the posterior abdominal wall for one and a half inches. It occupied the correct position for the appendix, which, indeed, it proved to be. Cut No. 1 shows its relative position in the abdominal cavity. Upon relieving the posterior adhesions, the cecum was brought forward and the appendix detached in the

regular way. The attachment to the cecum was larger than usual, being one inch across.

After removing the appendix the cavity was drained in the usual manner. The patient made the usual recovery for a drainage case.

The appendix when removed (see cut No. 2) presented a pear-shaped, pearly-white mass, bent upward upon itself at nearly a right angle and with a well-defined mesoappendix, with a decidedly soft, fluctuating portion at the apex for about one-half inch at the part attached to the anterior abdominal wall. The lumen was dilated and the walls were hypertrophied to about a quarter of an inch in thickness. It measured 6 inches in length and 2½ inches in diameter and 6¾ inches in circumference at the center. The exterior was smooth and glossy and solid. It was densely filled with a grey-colored muco-purulent, gelatinous material.

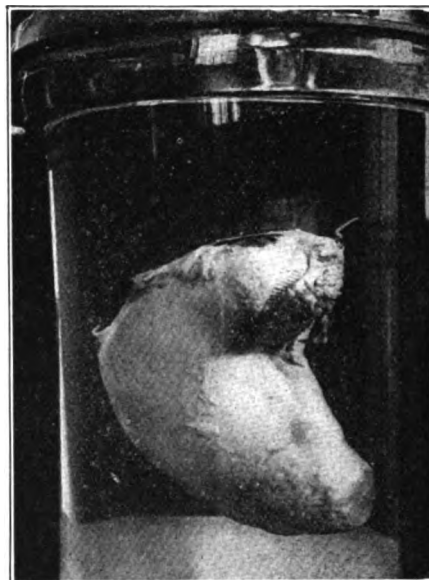


Fig. 2.

Dr. Francis A. Hulst had the following to say about the microscopical section of this specimen:

"The tissue consists of inflammatory exudate of the subacute type, involving the various walls, all of which are distinctly defined except the mucosa, which was probably not well fixed because of the fixation of the organ in mass. The specimen shows the lymph in the submucosa as usually found in the appendix.

"The contents consisted of debris and broken-down tissue, and pus cultures therefrom were negative, probably because of the formalin solution in which the specimen had been suspended. This is not a cyst of the appendix, but an infection of an hypertrophied appendix."

The case here recorded is, then, a straightforward one of appendicitis, with an appendix, not cystic, but of great size.

The largest appendix I can find recorded in the literature is one presented by F. Grauer, of New York City, to the Northwestern Medical and Sur-

\*Read before the Brooklyn Pathological Society, May 14, 1914.

gical Society in 1890. It measured  $12\frac{7}{8}$  inches in length; no mention was made of its width.

W. F. Howard reported a case in *Northwestern Medicine*, Vol. 4, No. 4, April, 1912. The appendix when removed was 5 inches long,  $3\frac{1}{2}$  inches in circumference near the distended apen,  $1\frac{1}{2}$  inches at the middle, where there was a torsion and constriction, and still smaller, about 1 inch, in circumference at the base, and was filled with a thick, purulent liquid matter.

Under date of April 13, 1914, George Brewer, of New York City, wrote to me:

"The largest appendix I ever saw measured 11 inches in length, extending well over into the left iliac fossa." He does not mention the diameter.

John B. Murphy, of Chicago, in a recent letter, referred me to Vol. 6 of Keen's Surgery, where I found under his name the following:

"In original article, Vol. 4, the length of the appendix was given from 1 to  $9\frac{1}{2}$  inches. To this may be added a case reported by A. Patel, measuring 10 inches. It was peculiarly shaped at the base, was nearly the same diameter as the ileum, then gradually narrowed until about the middle, where it was of the usual size, resembling the elongation of the cecum in canines."

Prof. George Huntington, of Columbia University, under date of May 14th, says:

"The largest appendix in our collection measures  $24\frac{1}{2}$  centimeters; the shortest one-half of a centimeter."

398 FRANKLIN AVENUE.

#### PASSIVE MOVEMENTS IN SPRAINS.

We are constantly hearing and reading about gentle passive motion in sprains. On what theory this advice is based it is hard to conceive by those of us who are constantly being called to treat the injurious effects of such procedures. Certainly we know that a sprained joint can be immobilized too long, but we also know that there is an acute stage even in a simple sprain when rest is the treatment, and especially is this true, as the sprain is accompanied always by a stretching of the tendons, capsules and ligaments and more or less synovitis; and many times, and perhaps always, there is not only stretching, but also rupturing and tearing of the structures mentioned above. How often do we see in sprains of the shoulder, after a few days at most, passive motion begun, and later, as the shoulder becomes more and more painfully stiff, forcible passive motion under an anesthetic, "to break up the adhesions," until the patient himself discovers, as he states, that the shoulder is getting worse and more stiff after each manipulation?—ARTHUR J. GILLETTE in the *J. A. M. A.*

## HOW SHOULD THE SURGEON BE GOWNED IN THE OPERATING ROOM?

FRANCIS REDER, M.D.,  
ST. LOUIS, MO.

"Will some one please wipe my face?" This is an expression from a surgeon at work that can frequently be heard in an operating room. There are times when a surgeon has good cause for having beads of perspiration upon his forehead, and it need not be during the hot summer time, either. It is very annoying to the surgeon to have his face bathed in perspiration while at work. He is unable to continue until his face is wiped. This means an interruption and often aggravation, because it is



very seldom that a face is wiped properly or satisfactorily. Especially is this true when a surgeon is compelled to wear glasses. Not very long ago my sympathy went out to a surgeon whom I saw at work on a common bile duct operation. He had gotten into a tight place and the beads of perspiration were pouring off his face. Two nurses were kept busy, one on each side of the surgeon, wiping his face. It was an ordeal for him, and his facial expression gave evidence of it.

While thus extending my silent sympathy to the surgeon, the thought of a surgeon's comfort while at work occurred to me. Really, when one considers the great amount of surgery that is being done, there are but very few operators who are properly gowned for the operating room.

Before giving my version of a proper attire for the surgeon in the operating room, an expression of condemnation is registered of him who operates in his undershirt. This is a base fault, a surgical

sin. At no time should the operator be more clean, more emaculate in his appearance, than when he steps up to the operating table.

What is the proper garb for a surgeon? Let us enumerate the necessary parts for his attire: For the head a piece of gauze, not less than six thicknesses, with a width of about four inches, long enough to encircle the head. This gauze bandage covers the forehead and should reach to the eyebrows. A similar gauze bandage is applied in a manner to cover chin, mouth (and nose if so desired) and the cheeks; it is secured on top of the head. Upon the head is then placed an operating room cap. This covers up the hair. From the illustration it will be seen that very little of the face is exposed. The dressing is not as hot as it appears. It is comfortable. The gauze bandages are thick enough to absorb all perspiration so that there is no need of any wiping—the face feels quite dry. This face dressing is best applied by the surgeon himself, as he can better adjust it to his comfort than a nurse. For the body, a medium heavy shirt of a cotton fabric (a basket weave is admirably suited to absorb perspiration), duck trousers and duck shoes (tennis shoes with white rubber soles), constitute an attire that is beyond criticism. These articles of dress, excepting the shoes, should be surgically clean, i. e., next to being sterile. The clothes are worn next to the skin, all other clothing (undergarments) having been removed.

In this garb the operator prepares his hands and arms for his surgical work. Having finished with this process, he proceeds to don his sterile operating room gown with the assistance of a nurse. It should be of a medium weight cotton fabric. The fabric known as "galatea" is a very desirable one. The gown should fit comfortably and have a length that reaches to the ankles. Its sleeves should extend to the wrist so that the operator may experience no difficulty in putting on his rubber gloves.

As a precaution and additional safeguard, it has been my custom to wear a pair of sterile bags or mittens over my gloved hands while the patient is being prepared for operation. These mittens are very loose and reach up to the elbow. They are made of medium heavy duck, which gives them a certain amount of stiffness, thus facilitating the placing of the gloved hands into them.

Some surgeons wrap a towel moistened with a 1:5000 bichloride solution, or with a normal salt solution, about their hands. This answers the same purpose, that of an auxiliary protection, while the final preparation of the patient is made. My preference is given to the mittens on account of their sim-

plicity and their perfect protection. The idea was adopted by me after having seen Dr. Franklin Brady, Surgeon to the Roosevelt Hospital, in Philadelphia, wear them.

#### EMPHYEMA THORACIS IN CHILDREN.

It should be a cardinal rule that as soon as we recognize the presence of pus in the pleural cavity, it should be evacuated at the earliest opportunity. Success in treatment depends largely upon its early removal, and if we can secure good drainage and keep the cavity free from sepsis, the risks of complications occurring are greatly diminished. I believe that the earlier the evacuation of the chest takes place the less chance is there of the development of purulent pericarditis and meningitis, which I consider are in the main due to the long continuance of pus in the pleural cavity. In most cases any attempt to relieve the effusion by aspiration is a dangerous waste of time, and is by no means an efficient method of treatment, but there are exceptions to this rule. In cases where the exploring syringe has drawn off turbid serum—by which I mean serum charged with pus cells—I have frequently aspirated with excellent results. Then, again, it should be tried in very young infants who are unable to stand a serious operation. Aspiration is also useful when the effusion is very large. It may in such cases be had recourse to on the day previous to incision, so as to avoid the danger of syncope due to the sudden evacuation of a large quantity of fluid. In small localized collections of pus it is also recommended, but I have had no experience in such cases. The objections to aspiration are that by this means we cannot remove all the pus, that large masses of fibrin are left; we get no drainage, and have generally to resort to other measures later. As a rule our choice lies between resection of a portion of rib and simple incision of the pleura, and there are points in favor of each method. By the excision of a portion of rib we undoubtedly get better drainage and less risk of sepsis, but, on the other hand, it is a more serious operation, takes longer time, and causes greater shock. Incision of the pleura is a very simple and easily performed operation, is followed by little shock, and the drainage is usually sufficient.—H. G. M. DUNLOP in the *Edinburgh Medical Journal*.

Unconscious patients should be catheterized at regular intervals of about eight hours.



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**WALTER M. BRICKNER, M.D., Editor****NEW YORK, DECEMBER, 1914.**

## WAR AND THE SURGEON.

The functions of the soldier are to destroy life, to maim or otherwise physically incapacitate those of his fellow human beings who are called "the enemy," to destroy property which might be of help to his opponents, and to appropriate from all sources whatever may be of aid in carrying out such aims. To these ends, all that science, art, and skill can produce are enlisted.

War continues until one side or the other has lost so many lives, has so many human beings incapacitated, and so much property destroyed that the remaining people are no longer willing to venture the hazard of being called upon for further sacrifice of themselves. The relic of the nation then stops the war: it ceases to fight and the war ends.

There are certain external agencies which keep war going and postpone the armistice which brings peace. One of these factors is the profit which the non-combatant nations can make out of the bleeding people. Another factor is the sympathetic interest of the non-combatant surgeon and the activities allied with him. Though the first of these is purely economic, the surgeon is no less its accomplice in keeping warfare alive. Thus we witness the spectacle of the people of the United States, with sanctimonious hypocrisy praying for the end of the war as a sort of Sunday performance, and during the week days lending their good

offices to big business to send over to the soldiers grains, meats and other foodstuffs, guns, powder, shot, and shell, to keep the slaughter going—all in the interest of profits.

Then comes the surgeon with sweet-voiced nurses and bandages and sheets and pillow-cases and goodies and soft beds, with the assumption that he is mitigating the horrors of war. However much he is mitigating the discomforts of individual warriors, one thing is certain: he is prolonging war; and war is nothing but horrors. Sentimentalism, combined with a confused ethical sense which calls for impartiality, results in a neutrality which promotes war.

A very simple mind can grasp the fact that if it helps one side in warfare, it damages the other side. But our sentimental neutral is often too tardy in his mathematics to grasp the fact that if he helps both sides, he damages both sides.

If the commercial and sentimental neutrals were really interested in mitigating the horrors of war, they would employ their efforts to end the war. To end war is the best way to mitigate war. The last thing that one, who really loves his fellow men, and who truly revolts at war, would think of would be to go into battle with a double-edged sword and fight against both sides. This is what our neutral surgeons are doing; and when we look upon the cost of one day of it we may calculate what will be the cost of the next day—the cost to both sides, for both are daily losing; and in the end both are destined to be losers by the aggregate of their days of warfare.

Were the neutrals desirous of mitigating the horrors of war, instead of maintaining merely a commercial and sentimental interest in it, they would be acting more reasonably to throw all of their help upon one side and end it. War continues so long as the damages are fairly balanced. It ends when the balance is lost and an unbalance of damages takes its place.

War is the consummate social crime. The soldier is a person who goes forth to kill his fellow man. The hope that he may kill but not be killed sends him on his errand. He is not only a cold-blooded murderer; he also is a gambler. He hopes to do his unholy business, come off with his life, and be ever after proclaimed a "hero." Society with its nationalism, patriotism, race hatreds, militarism, perverted histories which glorify war, and the international quest for commercial profits, creates the soldier—the dupe of war. If he knew that he were to fare as badly as he hopes his "enemy" will, he would not go. The nearer to one hundred per

cent. the mortality of warfare approaches, the less will be the enthusiasm for its "glories." If the mortality could be brought up to one hundred per cent. the problem would be solved, and war would cease. Do the activities of the surgeon of the Red Cross make for the abolition of war or for its perpetuation?

If the man of fighting age refused to go to war, or if he was proclaimed the hero who had moral courage enough to stay at home and do his work and refuse to participate in the miserable business, then the problem would be solved. Do the activities of the Red Cross surgeon, who rushes blythely to the front to keep alive this "sport of kings," make for war or for peace?

History may contemplate with amazement the white-robed surgeon attempting to save, while about him are murderous men, with all of the appliances of science, bent upon destroying, lives—all zealously working together. Perhaps society will some day look back with wonder upon the anachronism of the skilful surgeon, with his infinite possibilities for human service, laboring day and night to restore to efficiency the butchers of men, that they may be returned to their cruel pursuit.

War is something more than hell. It is the crucible in which a social system is tested and found to be dross.

Let the participating surgeon not lay upon his soul the unction that he is a noncombatant and inspired only by his love of humanity. We should not be deceived. He is a part of the program of war. When it is over, we shall find him parading among its "heroes," and bidding for the recognition which is accorded to those who went forth to kill.

Were the impelling motive, behind the sentimental neutral, one of love for humanity and a burning zeal to sacrifice himself for mankind, there are ample fields yet unoccupied in the industrial struggle in every land. In our own country the preventable deaths in the economic warfare for livelihood and for profits are quite as appalling to the discerning eye as those of the European channel. Here are the unaided hurt crying for help—hurt by machines and dust and poisons and rotten railroad ties and insufficient food and crowded slums—all because somebody is making money by withholding rightful human protection from them and robbing others of the wealth that they create. These suffering and dying millions go down to their graves without the stain of their fellows' blood upon their hands. They are soldiers in the world's warfare against the forces of nature, enlisted to

make the world more pleasant and life more livable, they stand for life, and not for death, they need all the surgeons, nurses, Red Cross stockings, and shirts that are now consumed by the blood-thirsty men who go forth to slay the husbands of innocent wives and the sons of guiltless mothers and the fathers of weeping babes.

Here is the answer to this social riddle: War is a ruling-class game. It is the affair of Kings, ministers, imperialists, and the capitalistic seekers for markets and economic aggrandizement. The Red Cross surgeon prefers the approval and applause of this so-called "upper class." The exploited poor in the industrial struggle have nothing to offer him but a doubtful gratitude. To give himself to them and their cause with the abandon that he can give himself to the cause of war would mean also to court the disapproval of those who have the wealth and "honors" to bestow.

There is no neutrality in war. All who are parties to it are warriors—the surgeon no less than the blood-lusting dupe of the military insanity.—  
JAMES P. WARBASSE.

#### ADDITIONS TO THE EDITORIAL STAFF OF THE ANESTHESIA SUPPLEMENT.

Pursuant to its policy of *service*, the SUPPLEMENT OF ANESTHESIA AND ANALGESIA of the AMERICAN JOURNAL OF SURGERY announces the acquisition of some important associates to its international editorial staff, among whom may be notably mentioned such authorities as Prof. Charles Baskerville, Prof. Dr. Guido Fisher, Dr. Edward H. Embly and Dr. Torrance-Thomson.

Prof. Charles Baskerville, Ph.D., F.C.S., is Professor of Chemistry and Director of Laboratories in the College of the City of New York, and is renowned as one of the world's most noted experts on the chemistry of anesthetic agents. He recently collaborated in the preparation of Gwathmey's monumental American volume on "Anesthesia." Prof. Baskerville is at present completing some original researches, and the SUPPLEMENT expects to publish his results in the near future.

Prof. Dr. Guido Fisher is Director of the Royal Dental Institute of the University of Marburg, Germany, and the author of "Local Anesthesia for Dentistry," translated for American readers by Prof. Richard Reithmuller of the University of Pennsylvania. Prof. Fisher has been signally honored, during a recent visit, by the entire dental profession of the United States, and his co-operation as an associate editor will be appreciated by all those who are vitally interested in conductive and

mucus methods of analgesia in the surgery of the oral cavity.

Dr. Edward Henry Embly, M.R.C.P., is not only one of the most noted surgeons of Australia, but his researches on ethyl chloride, anemia, and posture and systemic conditions in relation to anesthesia have been extensively quoted in the surgical journals of America and England. He has promised not only to contribute his personal investigations in anesthesia and analgesia to the SUPPLEMENT, but also to report on all important researches and advances in these subjects occurring in the Antipodes.

Dr. Torrance-Thomson, of Edinburgh, has been selected by the Executive Committee of the Scottish Society of Anesthetists as the most competent co-worker to represent the advancement of anesthesia in the land of Simpson, and his selection will undoubtedly receive the endorsement of those of the SUPPLEMENT'S readers who are familiar with his work.

The January issue of the SUPPLEMENT will be replete with interesting articles on anesthesia and analgesia, among which may be mentioned "The Treatment of Post-operative Shock," by Prof. Charles Lieb; "Continuous Anesthesia and Analgesia with Somnoform—The Technic of Administration," by Wm. Harper DeFord, D.D.S., M.D.; "The Proper Depth of Anesthesia," by Willis D. Gatch, M.D., F.A.C.S.; "Percentages in Nitrous Oxid-Oxygen Anesthesia," by Karl Connell, M.D., F.A.C.S.; "Rebreathing in Anesthesia and Analgesia," by E. I. McKesson, M.D., and "The Advantages of Combined Anesthesia in the Operative Treatment of Hemorrhoids," by Isadore Seff, M.D. Also in the Department of Medico-Legal Aspects of Anesthesia and Analgesia there will be a review of American and Continental court decisions involving the relations of the anesthetist and surgeon to anesthesia, analgesia, and the law.—F. H. M.

#### A FAKE SUBSCRIPTION SWINDLER.

A petty swindler has recently been operating among physicians in Pennsylvania and New Jersey. He has been taking cash in advance for "Subscriptions" to a well-known weekly magazine, with which he has no connection, and which he offers at half-price with a premium of ten volumes of fiction! He has been using subscription forms bearing the name of the American Press Association, to which concern he is also unknown.

## Surgical Suggestions

A fine lacrimal probe is the most convenient instrument for sounding the salivary ducts.

A ring pessary will often give immediate relief in cases of moderate cystocele causing frequent desire to urinate.

Acute infections of the kidney (pelvis) by the bacillus coli communis, however alarming the symptoms, usually subside without operative treatment.

When there is bleeding from the tongue, post-operative or otherwise, and one feels reasonably sure that the hemorrhage is arterial, it can, as a rule, be easily arrested by passing the forefinger down to the epiglottis and hyoid bone and drawing the base of the tongue upward toward the chin.

#### RELIEF FUND FOR BELGIAN PHYSICIANS.

Elsewhere in this issue will be found the announcement of a fund that is being raised for the relief of destitute physicians in Belgium. In some of the cities and villages of that unhappy country the distress of our colleagues, it would seem, is quite as critical as that of many San Francisco practitioners after the earthquake, to whose aid the American profession generously responded.

#### ERRATUM.

In the article on Bone Transplantation with Autogenous Sliding Grafts, by Raymond C. Turck, published in the November issue of the JOURNAL, the cross sections of bone illustrated in figure 11 are labeled "actual size." This is an error to which Dr. Turck has requested us to call attention.

#### HIP JOINT FRACTURES.

At the hip-joint dislocations very rarely require open operation, but fractures not unfrequently do so: where any unusual difficulty is found in reduction it would be safer to cut down and free the neck of the bone from an obstructing structure than to use too great a degree of force. If paralysis shows that the great sciatic nerve is implicated a posterior incision would be called for, and an anterior incision in forward displacements of the head of the femur.—J. J. CLARKE in *The Universal Medical Record*.

## Surgical Sociology

Ira S. Wile, M. D., Department Editor.

### THE 48-HOUR WEEK FOR NURSES.

In the reorganization of industrial society the labor union has played an important part. With the desire to promote the welfare of workers there has been great activity in securing legislation insuring shorter hours of labor, restricting the time and place of labor of women, and generally safeguarding the physical welfare of industrial workers of both sexes.

In the course of progress for social betterment there are undoubtedly types of legislation which when carried to their logical conclusion would result to the disadvantage of the state. For example, an eight-hour day law would hardly be practicable if forced upon the liberal professions. Professional life is largely distinguished from mere industrial duties by the large element of personal service entering into it. The restriction of hours of service for physicians would be almost a *reductio ad absurdum* of legislation in behalf of the restriction of hours of labor.

For many years nursing has been regarded in the light of a profession for women, and it appears strange to find legislation undermining the high standard of nursing by classing it as a type of labor which might well be restricted to a forty-eight-hour week. As a factor in lowering the efficiency of the nursing profession, union legislation of the type indicated is distinctly disadvantageous.

In New York State the registered nurse has assumed a higher professional standing than in many states of the Union. The nurses themselves have sought legislation to prevent the use of the word nurse by any persons save those duly qualified and licensed under the State Registration Act. It appears inconsistent to seek for the passage of laws modeled after the one enacted in California, but the State of Washington is contemplating the enactment of one restricting the hours of nurses so that it will apply not only to pupil nurses in hospitals but to graduate nurses in private practice.

The eight-hour law of California provides for the limitation of the work of pupil nurses to forty-eight hours a week. As originally drawn, the bill sought to include the graduate nurse, but, fortunately, the professional status of the graduate nurse was established and she was not condemned to suffer a restriction of her personal freedom. The California bill became a law June 14, 1913, since which time the hospitals of that state have been struggling with the administrative problems of giving adequate training to pupil nurses, limiting their payrolls, and maintaining adequate care for their patients without recourse to special nurses.

From the practical side of the question, the forty-eight-hour week has failed to provide adequate time for the instruction of pupil nurses. There

have been distinct limitations in the field of experience. Incidentally, inasmuch as this law is applicable to all women except graduate nurses, even the dietitians and the women internes come within its provisions. As a result of the restrictions of time, the training, experience, and executive work of pupil nurses are particularly curtailed and nurses are not properly fitted to take up executive work and special nursing. Furthermore, nursing in the special branches receives decreased attention with the result that the graduate pupil nurse is not as well prepared for her varied experiences in private practice as their sisters graduated during the years previous to the enactment of this special law.

The constant shifting of nurses is decidedly to the detriment of the patients, particularly after serious operations and during the course of obstetrical and puerperal care. The establishment of a forty-eight-hour week requires an increase in the number of available nurses beyond the number required under a regular eight-hour-day schedule.

The fact that such a restrictive law has been passed in California should arouse the attention of hospital superintendents throughout the country. No less interested are the members of the medical and surgical fraternity who depend for their best results upon the careful and efficient training of nurses. Inasmuch as the public has to pay the increased cost for the administration of hospitals, together with the additional expenditure necessary for securing extra nurses to take the place of the restricted pupil nurses, it may be said that it is vitally interested in the effects of legislation of this character.

The union principle does not recognize the possibility of personal service and self-sacrifice. It lowers the levels of nursing education and hampers the development of the nursing profession. The high ideals which the public has come to expect from nurses will be distinctly lowered by reducing the status of a trained nurse to that of an ordinary eight-hour day laborer.

While there may be some justification for the criticisms which have arisen regarding the treatment of pupil nurses in some hospitals of this country, the solution of the problem lies rather in the correction of the causes of such criticisms than to summarily legislate in such a way as to make it more difficult for hospitals to give proper care to their patrons. The legislation of a forty-eight-hour week for nurses decreases the quality of those to be graduated, increases the cost of nursing to the general public, and reduces nursing from a high plane of professional life to the category of ordinary unprofessional workers. A further development of the forty-eight-hour law as applying to all women would work a serious injustice upon professional women of all types now engaged in work connected with hospitals. The limit to forty-eight hours a week, the period of service of a housekeeper, a dietitian, or a woman interne would work a hardship upon the individuals, the institutions with which they are connected and the patrons whom they indirectly serve.

## Book Reviews

**A Text-Book of the Diseases of the Nose and Throat.** By JONATHAN WRIGHT, M.D., Director of the Department of Laboratories, New York Post-Graduate Medical School and Hospital, and HARMON SMITH, M.D., Surgeon to the Throat Department of the Manhattan Eye, Ear, Nose and Throat Hospital; Clinical Professor of Laryngology and Rhinology, Cornell University Medical School. Large Octavo; 683 pages; 313 engravings and 14 plates. Philadelphia and New York: LEA & FEBIGER, 1914.

The authorship of this new work on the nose and throat is a sufficient recommendation to warrant the feeling that many new and unusual features are to be found in its pages. Dr. Jonathan Wright stands pre-eminent in the rhino-laryngological world as a research worker along pathological lines, and Dr. Harmon Smith has been recognized time and again by those closely associated with him as a thinker and original investigator.

This volume is unique as a text-book on the nose and throat in that the essential part of it deals mainly with etiological factors and pathology, most of which is based on the original work of the authors. Voluminous references are omitted to make room for the expression of original opinions.

Twenty-five chapters divide the book into separate, essential parts. It is well illustrated with many original drawings and beautiful plates. Although exception may be taken to minor details, the general plan is so well worked out that we venture to state that it far surpasses anything on this subject that has been written within recent years.

**Diseases of the Nose, Throat and Ear, Medical and Surgical.** By WILLIAM LINCOLN BALLENGER, M.D., Professor of Otology, Rhinology and Laryngology, College of Physicians and Surgeons, Department of Medicine, University of Illinois, Chicago; Fellow of the American Laryngological Association; Fellow of the American Laryngological, Rhinological and Otolaryngological Association; Fellow of the American Academy of Ophthalmology and Otolaryngology, etc. *Fourth Edition*, revised and enlarged; large octavo; 1,080 pages; 536 engravings, and 33 plates. Philadelphia and New York: LEA & FEBIGER, 1914.

The distinguishing feature of this new edition will be found in the complete chapter on the labyrinth. The book has been completely revised and has been added to in many ways, and has thus increased its value. Among other new matters may be mentioned the complete description of Mosher's frontoethmoid operation. Mention is also made of the work on hay fever by autogenous vaccines. The section on functional tests of hearing has been rewritten. Among other matters taken up are Haynes' operation on the cisterna magna for hydracephalus, vaccine therapy and the His leukocyte-extract. The use of salvarsan in the treatment of syphilis of the brain and auditory nerve is gone into thoroughly.

**Life and Law.** The development and exercise of the sex function, together with a study of the effect of certain natural and human laws, and a consideration of the hygiene of sex. By MAUDE GLASGOW, M.D. Duodecimo; 194 pages. New York and London: G. P. PUTNAM'S SONS. The Knickerbocker Press, 1914.

This is one of the most eminently readable and effective books upon the sex question that we have encountered, for the reason that the author is a close student of biology as well as unusually well versed in the medical, legal and social aspects of her theme. Dr. Glasgow traces the earliest forms of sex instinct in the lower animal; she then expounds the physiology of sex relationship and fecundation in the human being. From this she passes to a consideration of gonorrhea and syphilis and their ravages, leading inevitably to a discussion of prostitution. The work ends with suggestions of measures to combat the sexual evil.

**Manual of the Diseases of the Eye, for Students and Practitioners.** By CHARLES H. MAY, M.D., Chief of Clinic and Instructor in Ophthalmology, Columbia University, New York, 1890-1903; Ophthalmic Surgeon to Mount Sinai Hospital; Consulting Ophthalmologist to Bellevue Hospital, New York, etc., etc. *Eighth American edition.* Duodecimo; 440 pages; 377 illustrations. New York: Wm. Wood & Co., 1914.

A new edition, or a fresh issue, of this excellent and remarkably popular manual is as welcome as the first breath of May—and comes almost as regularly. In addition to the seven preceding editions, this small work has been reprinted eight times for the American profession and its fourth British edition is in preparation. It has been translated into German, Italian, French, Dutch, Spanish and Japanese—in all of which it has had two to four editions. We expect yet to see the work appear in Russian, Turkish, Hindustani and all of the Philippine languages.

A comparison of this with the seventh edition shows that the work has, indeed, been thoroughly and conscientiously revised throughout. It still maintains, however, its distinctive character as a student's manual, the author keeping his additions within the limits of 30 pages of text and 17 illustrations.

**Urgent Surgery.** By FÉLIX LEJARS, Professor Agrégé à la Faculté de Médecine de Paris; Chirurgien de l'Hôpital Saint-Antoine. Translated from the Seventh French Edition by WM. S. DICKIE, F.R.C.S.; Surgeon, North Riding Infirmary, Middlesbrough; Consulting Surgeon, Eton Hospital, Eng. *Third English Impression (Eighth Edition).* In two large octavo volumes. *Volume I (Introductory—Head—Neck—Chest—Spine—Abdomen).* 614 pages; 485 figures and 10 plates. New York: Wm. Wood & Co., 1914. Half-morocco, \$8.00, net; cloth, \$7.00, net.

Lejars' "Chirurgie d'Urgence" is easily the best work on emergency surgery, the most popular, the most interesting, the most replete with valuable practical hints and observations. It is not difficult, therefore, to understand why it has appeared also in German, Italian, Japanese, Spanish, Russian, Hungarian and, now for the third time, in English.

Of the two volumes of the preceding English edition, reviews at some length appeared in the JOURNAL, 1910, 1911. In these the merits of the work were set forth and its general character described. This edition has been brought quite up to date and there are five new brief but interesting chapters on *acute dilatation of the stomach*, *acute pancreatitis*, *obstruction of the mesenteric vessels*, *sigmoiditis and perisigmoiditis*, and *dislocation of the pelvis*. There are many changes and additions to the excellent illustrations. We would repeat our earlier criticism that the operative treatment of fractures, other than of the skull, does not belong in the realm of emergency surgery and, properly, should not appear in such a work as this—not a severe criticism, to be sure.

**Chemistry for Nurses.** By REUBEN OTTENBERG, A.M., M.D., Lecturer to the Nurses' Training School, Mt. Sinai Hospital, New York; Instructor in Bacteriology, College of Physicians and Surgeons, Columbia University, and Assistant in Clinical Microscopy, Mt. Sinai Hospital. Duodecimo; 141 pages. New York: THE MACMILLAN COMPANY, 1914. Price, \$1.00.

Believing that some knowledge of chemistry is indispensable in the education of the trained nurse, and realizing that there is no book that takes up the subject in a manner suited to the limited technical knowledge of the nurse, Ottenberg has prepared this little manual. The book takes up in a very simple and elementary manner the fundamental principles underlying the chemistry of the body, and lays particular stress on reactions and tests in common use which the trained nurse ought to understand. The style is simple and direct, and the little volume fulfills its purpose admirably.

**The Pharmacy Handbook.** By F. W. CROSSLEY-HOLLAND, F.C.S., Pharmacist; Member of the Pharmaceutical Society of Great Britain, etc. Duodecimo; 224 pages. London: HENRY FROWDE and HODDER AND STOUTON, 1914. Price, \$2.00.

As the author says in his preface, this book is to present ready information matters which come within the purview of the practicing pharmacist. The subject matter is up-to-date, chapters being devoted to hormones, sera, vaccines and other newer therapeutic remedies. The book contains a great deal of useful information, including many tables for ready reference.

**Practical Bandaging, Including Adhesive and Plaster-of-Paris Dressings.** By ELDRIDGE L. ELIASON, A.B., M.D., Assistant Instructor in Surgery in the University of Pennsylvania Medical School; Assistant Surgeon, University of Pennsylvania Hospital, etc., etc. Octavo; 124 pages; 155 illustrations. Philadelphia and London: J. B. LIPPINCOTT COMPANY, 1914.

This is a brief presentation of the subject, written for students and nurses. The typical bandages are described and, in addition, methods found advantageous by the author. All the types of bandages that one need know are to be found succinctly described in Eliason's work. The illustrations are unusually clear and well chosen.

## Progress in Surgery

A Résumé of Recent Literature.

**Roentgenologic Observations on the Function of the Ileocolic Valve With Special Reference to the Causation of Ileac Stasis.** J. T. CASE, Battle Creek. *Journal American Medical Association*, October 3, 1914.

Case has studied the question of the competency of the ileocolic valve and of its incompetency as a cause of intestinal troubles. He sums up the evidence for its normal competency as follows: "1. The ileocecal valve is almost universally present in vertebrate animals; and, at least, in the dog, pig and cat, the valve is competent to the enema, withstanding enormous distention of the colon by fluid and gas. 2. By means of a string passed through the alimentary canal traction may be made on the valve lips, producing temporary incompetency. 3. In about one-sixth of the three thousand persons, most of them constipated and all suffering from gastro-intestinal disturbances, the bismuth enema passed the ileocecal valve and filled the terminal ileum for varying distances. 4. The valve incompetency thus determined is a constant phenomenon in those cases. 5. Patients with incompetency of the ileocecal valve describe characteristic disagreeable symptoms apparently due to passage of the enema into the small intestine. 6. In the marked cases there is also observed a reflux of ingested bismuth from the colon back into the ileum. 7. The occurrence of the incompetency is, to a large degree at least, independent of the temperature or composition of the opaque enema. 8. The incompetent ileocolic valve may be restored to competency by a simple surgical procedure, the competency persisting in some cases at least a year and a half. 9. In operation on patients with incompetent ileocolic valve the small bowel is found filled with gas to a very disturbing degree. 10. It is possible in the operation of ileosigmoidostomy to construct an efficient artificial ileocolic valve which will successfully act as a barrier against reflux from the colon. 11. Definite deviations from the normal anatomic structure are found at operation on cases of ileocecal valve incompetency. 12. Post-mortem studies show the ileocolic valve to be competent in the great majority of cases."

**End-Results in Cases of Gastric and Duodenal Ulcer.** ELLIOTT P. JOSLIN, Boston. *Journal of the American Medical Association*, November 21, 1914.

Joslin traced 9 per cent of the cases of gastric and duodenal ulcer seen in private practice during the last sixteen years. A number of cases of gastric or duodenal ulcer were revealed that were not so originally diagnosed. The basis of the diagnosis was the history, with special attention to the symptoms of hyperacidity, pain, hemorrhage, perforation, the duration of the case and the after-history, including also the facts developed by surgery and the necropsy reports. The total number of cases was 234, and 213, or 91 per cent, were traced to date; 142 of the patients were men; 92 women. The average age of the men was 45 years when first seen, but the age at onset was 38 years and 8 months. The corresponding age in women was 36 years and four months and 30 years and 10 months at onset. The average duration of ulcer in cases still unrelieved is 11 years and the average duration before the cases reached the surgeons, 10 years. One hundred and thirty-one patients received only medical treatment; 39 per cent of these recovered; 42 per cent were relieved; 12 per cent were unrelieved and 7 per cent are dead. Of the patients operated on when medical treatment failed 82 per cent were traced and 40 per cent are well; 16 per cent are relieved, 12 per cent no better and 32 per cent dead. Deducting twelve deaths for which the surgeon should not be held responsible, there were 70 surgical cases; 47 per cent now well; 19 per cent relieved; 14 per cent unrelieved and 20 per cent dead. The combined medical and surgical results show at present 84 patients well, or 39 per cent; 68 patients, or 32 per cent relieved; 26 patients unrelieved and 35 patients, 16 per cent, dead. Twelve, or 6 per cent of the 213 patients traced, died of cancer, and of the 46 patients now dead the mortality from cancer was 26 per cent.

**Value of Roentgenography in Diagnosis of Diseases of Larynx and Trachea.** SAMUEL IGLAUER, Cincinnati. *Journal of the American Medical Association*, November 21, 1914.

Iglauer finds roentgenography particularly valuable for the study of the normal process of ossification of the larynx, which should be understood to appreciate the pathologic changes of the organ. He describes the technic, which is simple: "The patient sits on a chair or lies on a couch with the plate (8 by 10) in contact with the side of the neck and parallel to the median plane of the body. The patient is instructed to hold his breath and not to swallow during the exposure, which requires about six seconds. A profile picture of the larynx is thus obtained, with one side of the larynx superimposed on the other, but the side in contact with the plate comes out very distinctly. The roentgenogram of the normal larynx in tuberculosis, syphilis, cancer, fractures and other conditions are also described. While satisfactory diagnosis of diseases of the larynx and trachea can be made by the ordinary methods in most cases, the changes in the underlying and adjacent structures which are more or less involved with the mucosa are shown also by the Roentgen examination, and the data obtained are of great value in guiding operative procedures. In stenosis or distortion of the lumen or trachea the ray usually reveals the seat, the nature and extent of the lesion. Owing to the ease with which it is made, the ray has a special value in the examination of children and nervous patients.

**Concerning Primary Resection of the Large Intestine.** (Zur Frage der Primären Dickdarmresektion.) R. VON RAUCHENBICHLER, Musbruck. *Archiv fuer Klinische Chirurgie*, Vol. 105, Part I.

This paper is based upon a careful study of the immediate and final results of a series of thirty-seven cases of primary resection of the large intestine. Most of the operations were done for carcinoma of the bowel. The author's chief purpose is to demonstrate that, after all the factors are considered, primary resection, rather than the two and three-stage procedures, is the operation of choice. However, it is contraindicated in the presence of acute



obstruction. Chronic ileus is not a contraindication, provided the patient's general condition is reasonably good. There is no striking difference between the mortality of primary and several-stage resection. The former offers the patient the briefest period of convalescence and does not subject him to the possibilities of complications from more than one operation. Besides, it makes a much wider removal of the growth possible than does the several-stage procedure, in cases of very extensive tumors. The author's analysis indicates that adherents of the several-stage operation are therefore much more prone to perform palliative operations than those who regularly make primary resections. In this sense the end-results of the latter are far more satisfactory.

### The Physical Diagnosis of Displacement of the Colon.

JOHN H. MUSSER, JR., Philadelphia. *Interstate Medical Record*, September, 1914.

Although according to Musser the routine outlining of the colon in the course of a physical examination is neither necessary nor important, there are certain conditions in which such an examination is indicated. Whenever this is the case, the author advises the use of a rectal tube and an attached rubber bulb by which air may be forced into the large intestine. By means of this inflation, which is well borne by the patient, the outlines of the large intestine may be fairly well mapped out. The cecum, though it is ordinarily to be felt in only about 20 per cent of cases, may be palpated in the majority of patients when inflated. The following method of auscultatory percussion is recommended: the stethoscope is placed over the cecum and the abdomen percussed. When the percussion takes place over the colon, the sound heard in the stethoscope over the cecum will suddenly change in character and intensity.

### Luetic Contractures of the Stomach. E. L. TUOHY, Duluth, Minn. *Interstate Medical Journal*, September, 1914.

The author gives a very complete review of the literature on syphilis of the stomach and adds to the reported cases two of his own which he believes are gastric conditions of luetic origin. Both the cases show hour-glass stomachs, have positive Wassermann reactions and improved markedly under specific treatment. Although there is no way of absolutely proving the condition in the stomach to be due to syphilis, the prompt amelioration of the symptoms and the consequent rapid gain in weight would seem to point to the luetic origin.

On practical grounds it must be agreed that syphilis does involve the stomach—that the gummatous or ulcerating tissue can cause scarring and shrinking—and that hour-glass stomach might theoretically occur. To go further, and state positively that syphilis alone does this in an individual case, independent of any other processes, premises an hypothesis which cannot be too cautiously made.

### The Employment of Paravertebral Anesthesia in Gall Stone Surgery. (Die Paravertebral Anesthesia in Dienste der Gallenstein Chirurgie.) A. T. JURASZ, Leipzig. *Zentralblatt für Chirurgie*, August 29, 1914.

By paravertebral anesthesia Jurasz refers to the cocainization of the spinal roots, a method of anesthesia first suggested by Sellheim. It has been used with success by various surgeons in abdominal surgery, and is now advocated by Jurasz for the removal of gall stones. Jurasz advocates it only for cases where, for other reasons, general anesthesia is not practicable. The technic consists (in general terms) in injecting about 5 ccm. of a one per cent novocain solution into the spinal roots of the side upon which the lesion is. (For the method and necessary landmarks the reader is referred to the original paper.) For gall-bladder surgery, the spinal ganglia from the sixth to the twelfth dorsal are anesthetized. Jurasz reports two cases in which the anesthesia proved eminently successful.

### Permanent Drainage of Ascites. (Zur Dauerdrainage bei Ascites.) A. OBERST, Freiburg. *Zentralblatt für Chirurgie*, September 12, 1914.

The various methods of making drainage of ascites into the general circulation all have their disadvantages, especially the methods whereby the peritoneal cavity is made to drain into the subcutaneous tissues of the abdomen. (Glass bobbins, tubes, wire, silk threads.) In order to obviate these disadvantages, Oberst suggests an ingenious operation whereby a flap of skin taken from the abdominal wall is buried in the form of a tube or gutter, communicating on the one hand with the peritoneal cavity and on the other with the subcutaneous tissue of the abdominal wall. The operation is simple and possesses the great advantage that no foreign body is introduced and the canal or gutter thereby remains permanently potent.

### Pituitary Extract in Obstetrics. SAMUEL J. DRUSKIN, New York. *American Journal of Obstetrics*, October, 1914.

The author is enthusiastic over his results. He holds that no forceps operation, no pubiotomy or Caesarian section in the lesser degrees of pelvic contraction, should be performed without a previous trial of pituitary extract. No manual separation of the placenta should be attempted without the previous administration of this drug. The author believes it should be given to prevent uterine atony and to combat metorrhagia of the puerperium, foul-smelling lochia and retained secundines. Druskin has used it with satisfaction even after the induction of the "twilight sleep."

### Tracheloplasty, a New Operation for the Relief of Sterility Due to Stenosis of the Cervix Uteri.

EDWARD A. SCHUMANN, Philadelphia. *American Journal of Obstetrics*, October, 1914.

Schumann has devised an operation by which a tongue of vaginal mucous membrane is laid into a wedge cut into the posterior cervical wall. Thus flat squamous epithelium covers the cervical wall which cannot become hyperplastic and occlude the canal. In from five to seven days after the vaginal strip has healed into its new position, it is released from the vagina.

### Scopolamine-Narcophin Seminarcosis in Labor. JAMES A. HARRAR and ROSS MCPHERSON, New York. *American Journal of Obstetrics*, October, 1914. *The Use of Scopolamine in Obstetrics*. A. J. RONGY, New York. *American Journal of Obstetrics*, October, 1914.

Both these papers report about the same results in an almost equal number of cases. Between 70 and 80 per cent. of the trials are successful, the number of forceps cases is a trifle greater than without the use of this narcotic, the asphyxiated and partially asphyxiated babies about the same in number with or without the use of scopolamine. The second stage of labor is apt to be somewhat prolonged, these authors find. While pain is diminished, it is not entirely absent, but amnesia is almost always present. Both mother and baby must be carefully and constantly watched during the entire labor.

### The Surgical Treatment of Exophthalmos. C. H. MAYO, Rochester. *Journal American Medical Association*, October 3, 1914.

Mayo gives a brief account of the studies that have been made on exophthalmos in hyperthyroidism and refers to Landstrom's discovery of a previously undescribed microscopic muscle under the control of the sympathetic system which affords the most acceptable explanation of the development of exophthalmos. It has been noted since 1873 that irritation of the sympathetic ganglion caused dilation of the iris and some protrusion of the globe. Bénard has shown that irritation of the cervical sympathetic pushes forward the eyeball and Jaboulay in 1896 was the first to introduce an operation on the sympathetic ganglion for exophthalmic goiter. While a number of such operations have been performed, especially by Jonnesco, the relief in general is apparently about the same as that following

ligation of the vessels and the injection of boiling water into the gland. The operations on the thyroid, however, do not always relieve exophthalmos and the Jaboulay operation, that is, a cervical sympathectomy of the superior, and sometimes of the middle ganglion for the sole purpose of reducing exophthalmos and securing a slight ptosis of the upper lids, has been performed in the Mayo clinic in cases in which the nervous symptoms are excessive and the exophthalmos extreme. "This operation can be done with novocain as a local anesthetic, but is preferably made with a general or combined anesthetic. Incisions are made in the lines of the natural creases in the neck opposite the bifurcation of the carotid. The sternomastoid is drawn outward and a blunt dissection is made down to the jugular and carotid veins, which are then drawn inward. The posterior sheath of fascia inclosing these vessels is opened that the vagus nerve may be kept under observation, since this nerve is bulbous above this point and might be confused with the sympathetic. Under normal conditions the sympathetic ganglion is one-eighth to one-fourth of an inch wide. Many branches lead from it on either side. The connecting branches are divided, the upper part of the ganglion torn off or cut and lower portions of the nerve cut or torn at the middle ganglion unless the middle ganglion is also removed. The wound is closed without drainage." The result is very good in securing the relaxation of the eyeball and slight ptosis of the upper lid with great general improvement. The ease with which it is performed and the excellent results which frequently follow its employment render it worthy of consideration in cases of extreme exophthalmos. In some cases where the sympathetic does not seem to occur as a ganglion and with fewer and larger communicating branches, the results are not so good, the operation seeming to be incomplete. In cases in which the vessels of both upper poles were ligated in addition to the sympathectomy, the primary results were good, but it is too early to announce a permanent cure.

#### The Orbital Approach to the Cavernous Sinus. HARRIS PEYTON MOSHER. *The Laryngoscope*, 1914.

Mosher's plan is to gain access to the cavernous sinus through the inner half of the orbital plate of the great wing of the sphenoid. Such an operation was performed on a patient after experiments on the cadaver, but the man died in a few days. An autopsy proved that the cavernous sinus had not been entered. The writer then began a series of investigations on the cadaver which resulted in his perfecting the following operation: The globe of the eye is removed and the orbit cleaned out. Then the ophthalmic artery is tied. The groove in which the superior maxillary nerve runs is found and the periosteum is then separated from the orbital surface of the great wing of the sphenoid. The opening is made with a chisel from the notch for the superior maxillary nerve to the outer end of the sphenoidal fissure. The opening is enlarged outward. The dura is then elevated, the sinus is exposed and a blunt-pointed knife is inserted, and carried forward until it is stopped by the sphenoid bone. Through this opening a small curette may be carried backward through the whole sinus.

#### Advances in the Treatment of Gonorrhea. S. W. MOORHEAD. Philadelphia. *The Therapeutic Gazette*, October 15, 1914.

Moorhead advocates the use of the abortive treatment in cases seen early, as advocated by Ballenger—the sealing of a freshly prepared 5 per cent solution of argyrol in the urethra by means of collodion. This is repeated daily for five days, when in a large percentage of cases the disease will be found cured. In chronic gonorrhea the use of electrically heated sounds retained for thirty to sixty minutes at a temperature of 120° F. is recommended; also the use of the galvanic current to carry ions of silver, zinc or copper into the periurethral tissues. In cases seen too late to attempt the abortive treatment, 5 per cent argyrol or ½ per cent protargol hand injections four times daily, to be retained for five minutes, are advised. After the gonococci have disappeared, one per cent zinc sulphate should be used.

#### The Surgical Treatment of Nephroptosis by Occlusion of the Perinephric Fascial Sac. (Capsular Occlusion). C. B. LOCKWOOD, London. *British Medical Journal*, October 3, 1914.

Lockwood criticizes the conventional operations for anchoring movable kidneys upon two grounds. 1. The very frequent recurrences. 2. Because they interfere with the normal mobility of the kidney. Lockwood believes that the normal mobility of the kidneys has an important influence upon their function. He then describes the anatomy of the perinephric fascial sac and shows that in nephroptosis the kidney prolapses, not because of dislocation of this sac, but because the sac has become too capacious. Based upon this principle, Lockwood has devised an operation in which the perinephric sac is shortened at its lower pole by appropriately placed sutures, permitting the kidney to remain in its normal position and at the same time retaining its mobility. Lockwood reports four cases in which the operation proved successful.

#### Experimental Studies Upon Extirpation of the Lung. (Experimentelle Studien ueber die Lungenextirpation.) K. KAWAMURA, Japan. *Deutsche Zeitschrift fuer Chirurgie*, Vol. 131, Parts 3 and 4.

The results of various methods of pneumectomy were analyzed and the final outcome determined, in a very interesting series of operations upon dogs. It was shown that the animals thrive indefinitely after removal of one lung, and even after amputation of part of the remaining lung. Young animals grow in an approximately normal manner after extirpation of one lung.

At the operation the chief difficulty lies in the closure of the bronchial stump. Willy Meyer's method (crushing, and inversion by several tiers of sutures) was found the most reliable, but cannot be applied when the main bronchus is short or in small animals. Kawamura reports satisfactory results in many cases in which he divided the pulmonary hilus between clamps, ligated the vessels and bronchi by sutures passed through their walls, and made a careful continuous suture of the chest-wall.

The positive pressure apparatus used at the operations was found more satisfactory than the negative pressure ones. There were no instances in which fluid collected in the thorax after removal of the lung. The remaining lung is already increased in size at the end of the operation. The increase reaches its maximum in thirty to sixty days after pneumectomy. The gap left by the removal of the lung is filled in, in the above mentioned time, by enlargement of the remaining lung, the displacement of the heart and diaphragm, elevation of the diaphragm, the sinking of the upper thoracic aperture and lateral chest wall. Pronounced scoliosis with convexity towards the operated side develops regularly.

The microscopic changes in the remaining lung were of considerable interest. Soon after the operation the picture was that of acute vesicular emphysema; this changed gradually to one of "vicarious" emphysema. Although hyperplasia of the lung was never observed, a true compensatory hypertrophy developed regularly. The vessels of the lung, at first dilated, subsequently proliferate.

All of Kawamura's observations indicate the feasibility of pneumectomy, from the viewpoints of technic and ultimate outlook.

#### A Study of Tuberculous Lesions in Infants and Young Children, Based on Post-Mortem Examinations. MARTHA WOLLSTEIN and FREDERICK H. BARTLETT. *American Journal of Diseases of Children*, November, 1914.

In 1320 post-mortem examinations made at the Babies' Hospital of New York City, 178 cases showed tuberculous lesions. In a very careful analysis of these latter cases the authors come to the following conclusions:

The largest number were of inhalation origin, as shown by the large percentage of cases in which the pulmonary lesions were the most advanced in the body. The absence of tuberculous lesions from the lungs in fourteen cases and the presence of tubercular lesions in the bronchial nodes in seven of these seems to show that it is pos-

sible for the tubercle bacillus to pass through the lungs without localizing there. The marked tendency to rapid and general dissemination of the tuberculous lesions throughout the body in infants less than a year old is well shown. The survival of any young infant infected with tuberculosis for more than six months is very remote, while healing of tuberculous lesions in young infants is practically out of the question. In the entire series not a single healed tuberculous lesion was encountered, and attempts at healing, shown by calcified areas, were found only five times in the lung and thirteen times in lymph-nodes. Encapsulation of tuberculous lesions was not encountered in this series of cases, nor was congenital tuberculosis found.

**Non-Operative Treatment of Tuberculous Glands of the Neck.** R. T. MORRIS, New York. *New York Medical Journal*, October 3, 1914.

Morris concludes his paper with the following significant sentence: "Previous to ten years ago I operated many times in the course of the year for the removal of tuberculous glands of the neck, but during the past ten years I have not operated once for non-suppurating glands." The only indication, according to Morris, is incision and drainage of suppurating glands. Of non-operative methods Morris recommends the following: 1. Injection of seven per cent solution of iodoform in oil. From one to three minims are injected into each one of the glands at a sitting, at intervals of three or four days. 2. Active hyperemia induced by the alternate application of hot and iced applications to the neck. 3. High frequency current or  $x$ -ray. 4. Tuberculin. Morris has seen marked benefit from all four methods.

**Osteoplastic Closure of the Trifacial Foramina.** A. B. KANAVEL, Chicago. *Journal American Medical Association*, October 10, 1914.

Kanavel reports an experimental study of osteoplastic closure of the trifacial foramina. The experiments were made on dogs and three methods were tried: (a) Avulsion of the nerve with curettage of the canal, breaking down of the foramen and covering the area as well as possible by pedicle-flap of adjacent periosteum. (b) Avulsion of the nerve, curettage of the canal and a transplant of periosteum from some other part of the body. (c) Avulsion of the nerve, curettage of the canal, and a transplant of bone to fill the canal. These methods are illustrated. In avulsing the nerve it was found that the best results were obtained by grasping the nerve firmly and twisting very slowly so that from five to ten minutes were consumed in the procedure. Detailed reports of the experiments are not given though they were kept. In series A, with covering the canal with pedicle periosteum flap, the experiments were uniformly successful in obliterating the canal if the work was thoroughly done. There was some difficulty in preserving the adjacent periosteum in good condition for the flap. In the second group, B, the results were not nearly so successful, the nerve growing through in the majority of cases. In the third group with avulsion of the nerve and transplant of bone to fill the foramen the experiments were successful excepting when infection occurred, which was rather common on account of the locality of the wound in the mouth. When successful the complete bony closure followed. These results, Kanavel says, may find practical application in various conditions, but primarily as a palliative measure in the treatment of trifacial neuralgia when other measures fail to give relief. It would not be indicated when a ganglion extirpation according to Frazier and Spiller can be done with safety or where alcohol injections give considerable relief for a long time. He reports a case of the practical application of the method in which he operated on the infra-orbital and dental branches of the fifth nerve with good results. He warns against extending an infra-orbital incision too near the nose and thus endangering the lacrymal sac and also against injuring the facial nerve when retracting the muscle at the angle of the jaw in the lower operation. The infra-orbital foramen was plugged in his patient with a bit of the tibia with periosteum attached. In the lower operation on the dental nerve a

crucial incision was made in the periosteum under the angle of the jaw over the area of the nerve and a small button taken out with the trephine down to the medulla. The canal was then curetted and the button replaced, but rotated so that the destroyed canal was at right angles to the canal of the bone. He presents this paper as an experimental and clinical study, but does not advocate the operation until he and others have had further experience with it.

**Muscle Bound Feet.** RUSSEL A. HIBBS, New York. *New York Medical Journal*, October 24, 1914.

By "muscle bound feet" Hibbs refers to a rather common malady, in which the patient is prevented from walking long distances because of incomplete flexion of the foot. Normal flexion is obtainable up to 70° or 80°, but in these patients only 90° is possible. The condition, Hibbs says, is due to shortening of the posterior leg muscles, and is associated with a great variety of symptoms. The patient is easily tired upon walking, the feet are painful, the gait is inflexible, some have backache, and others have Martin's metatarsalgia. In addition, these patients are frequently of the nervous type. In addition to the physical sign mentioned above, there may be lateral deformity (abduction), flat feet, and a poor circulation as evidenced by cold and clammy feet. To cure the condition, Hibbs recommends incision of the sheath of the tendo Achilles, lengthening of the tendon to the sufficient requirement, and closure of the sheath. Hibbs has found this operation curative in 38 cases.

**Extension of the Calcaneus.** (*Die Drahtextension am Calcaneus.*) E. GELINSKY, Berlin. *Zentralblatt für Chirurgie*, August 22, 1914.

Steinmann's original communication upon his method of obtaining extension in fractures of the femur advocated perforation of the condyles of the femur. Klapp modified this method by suggesting that the calcaneus be employed for this purpose. Now Gelinsky suggests that the attachment of the tendo Achilles is the best method, because it does away with the perforation of bone and its possible consequences; furthermore it is far more feasible.

**On an Unfamiliar Action of the X-ray and its Therapeutic Value.** (*Ueber eine unbekannte Wirkung der Röntgenstrahlen und ihre Therapeutische Verwertung.*) H. ECKSTEIN, Berlin. *Berliner Klinische Wochenschrift*, September 7, 1914.

Having noticed upon his own person that the  $x$ -ray had a marked effect in relieving pain after an injury, Eckstein has since applied the  $x$ -ray to many cases of localized pain throughout the body. He has used it in contusions, fractures, dislocations, inflammatory swellings of the joints, and finds that one or more applications usually suffice to relieve pain. Eckstein applies it through a hard or medium hard tube, with 0.4 or 0.2 milliamperes current at a distance of 15 to 30 cm. for two to seven minutes. At first no filter is used; later he uses an aluminum or lead filter.

**Transfusion—Direct and Indirect. Simplified Methods.** B. M. BERNHEIM and A. P. JONES, Baltimore. *Southern Medical Journal*, November, 1914.

The authors describe Kimpton's glass cylinder method and Lindeman's syringe method of blood transfusion and then compare these with their own method of direct transfusion by means of a canula. They claim that the latter has distinct advantages over the indirect methods, in that first it needs less special apparatus and second the transfusion can be interrupted and again started if necessary. They describe a case in which a sudden hemorrhage occurred from an intestinal ulcer. A transfusion was started and continued until the patient was ready for a gastro-enterostomy. During the latter operation the canulae were left in both the donor's and recipient's vessels. During the enterostomy the patient's condition became bad and it was possible to relieve him at once by means of a continuation of the transfusion.

The authors advocate strongly the use of blood-pressure readings in order to determine how much blood has passed to the recipient.

**Cancer of the Tongue, Based Upon the Study of One Hundred Cases.** JOS. C. BLOODGOOD, Baltimore. *Canadian Journal of Medicine and Surgery*, September, 1914.

This study has led to some remarkable conclusions. It has been demonstrated that the failure to cure when cancer of the tongue is fully developed is due chiefly to the neglect to remove the muscles of the floor of the mouth below the cancer. The high mortality after the operation is chiefly due to the removal of the floor of the mouth without removing at the same time a section of the lower jaw. If operated on very early, it is sufficient to remove the growth with a good margin of healthy tissue. In such cases there are almost 100 per cent of recoveries.

The author proceeds as follows: The glands of the neck are first removed and, after the operation, their connection with the floor of the mouth below the lesion is thoroughly burned with the cautery and the wound closed. Then the lesion in the tongue or floor of the mouth is attacked with the electro-cautery. The application of this is usually repeated two or more times, until everything is destroyed down to the area of the first cauterization from below. The healed skin flap of the first operation forms the floor of the mouth and prevents an oral fistula. In the author's most recent cases the operation has been done in three stages. When the author considers the cases (fourteen in all) personally operated on by him by these new methods in the past five years, he finds that there has been no post-operative mortality and so far but one patient is dead of recurrent carcinoma. When 86 other cases operated upon by methods previously used are considered, the advantage of the new technic is apparent, for formerly there was a post-operative mortality of 22 per cent. Bloodgood concludes as follows: "We have, therefore, apparently conquered the technic of operations for cancer of the tongue. Now, if we can educate men to come earlier, we shall probably conquer the disease."

**Gastric Cancer in the Young. A Study of Sixteen Instances in Patients Under the Age of Thirty-one.** FRANK SMITHIES, Chicago. *Journal of the American Medical Association*, November 21, 1914.

With an analysis of sixteen cases of gastric cancer in patients under the age of 31, Smithies reviews the statistics derived elsewhere and the recognized types of the disease. Six instances, some of them dubious, have been recorded in patients below the age of 10. In the second decade thirteen cases have been reported, but in five of these there were no reliable pathologic reports. In the thirteen cases in the third decade there were also a few, but in a few of these there was a seemingly malignant gastric disease. In his total group of 721 pathologically demonstrated gastric cancers from the Mayo Clinic and the Augustana Hospital, Chicago, the percentage of youthful cases was 2.2. There were nine females and seven males; the youngest aged 18, the oldest 30; the average age 27.8 years. In 12 per cent of the thirteen there was a family history of cancer. Apparently occupation was not a causal factor. Two types of histories are noted, the first including cases of a pernicious, gastric affection of progressive course appeared with no preceding stomach ailment. In the second group there was a previous history of gastric complaints conforming to the type usually called peptic ulcer. Two of the sixteen cases fall into the first class and the average duration was 4.5 months. In the other fourteen the patients had been affected for an average of 4.8 years with some gastric malfunction which in its early stages had been roughly classed as dyspepsia. In five of the cases the syndrome was that of gastric ulcer. In four cases the so-called ulcer features were definite in some stage in the early period and in four other cases the symptoms were those of ulcer of an irregular type. In their remaining case there had been gall-stone attacks for four years and stones were found on laparotomy. The later stage of all in group two was typical of gastric malignancy. This period averaged 7.8 months, the shortest three weeks, the longest nearly three years. The malignant course in this group took nearly half again as much time on the average as that in group one. In six instances the appetite was poor and constipation was the rule in all. In the malignant stage there was marked loss of weight, in the early part of the dis-

ease, intermittent. Some degree of pain was noted in all cases, in two instances suggesting perforation. In the two cases of the first group it was never severe, but was continuous and generally aggravated by food and drink. In the other fourteen it came in spells or attacks in twelve. In seven instances it had a fairly definite relation to indigestion; in four instances, even after malignancy was shown, the food relief of pain persisted, but in ten it changed to food aggravation of pain. There was abdominal tenderness in all and tumor was palpated in six cases of the entire series. Eructations and pyrosis were commonly noted, and vomiting at some time in the course of the disease. Hemoglobin estimation in some cases averaged 66 per cent; and in ten blood was chemically demonstrated in the stools. In fifteen cases important facts were demonstrated by test-meals. Gastric motility was affected in eleven and dilatation of the stomach had occurred. Achylia appeared in none and free hydrochloric acid was absent in but one instance. Combined hydrochloric and acid salts averaged 18.1, ranging from 0 to 50. Lactic acid was demonstrated in six cases and altered blood chemically shown in gastric contents twelve times. The Boas-Oppler bacillus was recognized six times and yeasts and sarcinae were present in eight. The laparotomy findings showed the pylorus involved in five, the lesser curvature and some part of the gastric surface in nine; infiltration of the cardia in one and one case of general carcinoma. Lymph-nodes had been invaded in fourteen and secondary growth demonstrated in other organs in nine. In eight, medullary cancerous ulcers were present. In the others, adenocarcinoma of the common type. In five cases some form of resection was performed; in seven drainage operations to fit the case, and in four only exploration was possible. Nine patients died within one and one-quarter years following operation. To the other patients a lease of life from two to more than five years was granted. A tabulated summary of the cases accompanies the paper.

**Bacteriology of Cholecystitis and Its Production by Injection of Streptococci.** E. C. ROSENOW, Chicago. *Journal of the American Medical Association*, November 21, 1914.

Little attention has been given heretofore to the bacteriology of the tissues of the gall-bladder wall in cholecystitis. He gives an account of the bacteriologic findings in a case and of experimental work on producing cholecystitis in animals. The strains of streptococci producing cholecystitis are strikingly similar and resemble those from ulcers of the stomach. The lesions most commonly observed other than cholecystitis, when these streptococci are injected, especially in rabbits, are an ulcer of the stomach, hepatitis about the gall-bladder myositis, and myocarditis, arthritis, appendicitis, and colitis. He says: "The common presence of streptococci in the wall of the infected gall-bladder and in the center of gall-stones, often in pure culture, while absent from the bile, and their affinity for the gall-bladder in animals, are strong evidence that streptococci are the cause of cholecystitis in man far more frequently than is believed, and serves to explain the good results reported by some as following cholecystectomy in cases of myocarditis, arthritis, and other conditions."

**The Surgical Treatment of Pericystitis.** EUGENE FULLER, New York. *Medical Record*, October 3, 1914.

In the operation of seminal vesiculotomy, performed for the relief of the usual symptoms, mainly sexual, Fuller noted that the cystitis, which is frequently associated with such symptoms, cleared up after the operation. This led to cystoscopic examination of such bladders, and he found that the cystitis was confined to the base of the organ, in fact to that part of the bladder lying over the seminal vesicles. Fuller classifies these inflammations, therefore, as pericystitis. Further experience has shown Fuller that these inflammations are sometimes very extensive and occupy nearly the entire bladder mucosa. The important point that Fuller emphasizes is that the usual treatment of cystitis, viz., irrigations, drainage, etc., do no good in these cases; indeed they may even do harm. The only rational and effective treatment is seminal vesiculotomy. Fuller reports in detail three illustrated cases.







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